A PUTMAN PUBLICATION JANUARY 1958

Controlled conveyor set-up minimizes inventories, speeds warehousing page 78

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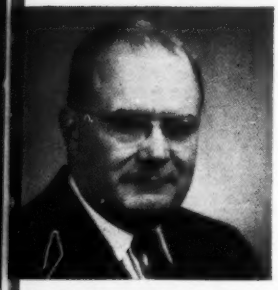
CHEMICAL PROCESSING

CHEMICAL PROCESSING LEADERS LOOK AT 1958



...AY—*Pittsburgh Plate Glass*
Paint and Varnish

HANS STAUFFER—*Stauffer*
Chemicals

VENEMA—*UOP*
Petrochemicals

No boom year for sure, but still a good one for their industries

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HUMPHREYS—*US Rubber*
Rubber

O'NEAL—*Chemstrand*
Chemical Fibers

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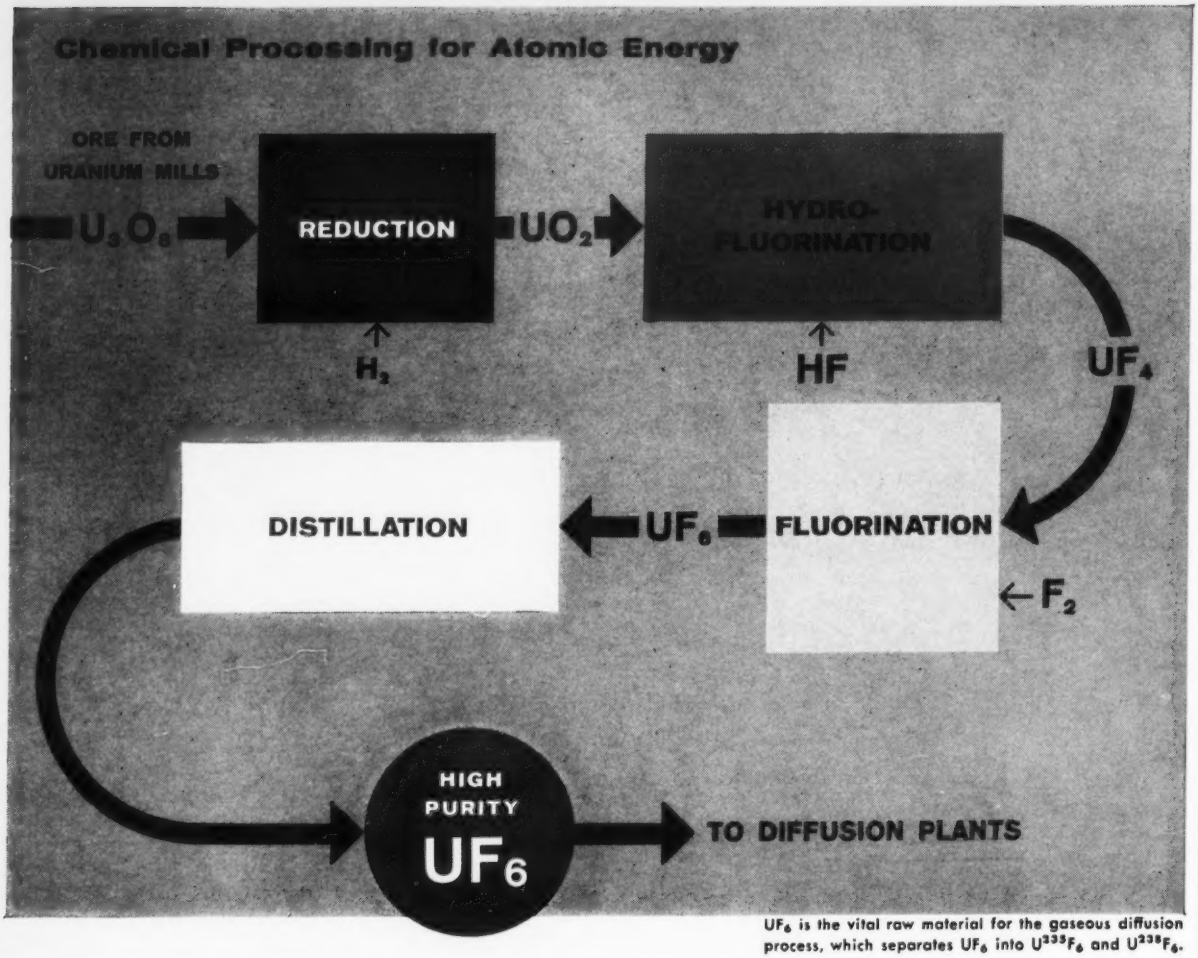

UF_6 is the vital raw material for the gaseous diffusion process, which separates UF_6 into $U^{235}F_6$ and $U^{238}F_6$.

NEW PROCESS FOR URANIUM HEXAFLUORIDE

wins General Chemical a share in 1957 Chemical Engineering Award

One of the highest honors in the chemical industry—The Chemical Engineering Achievement Award—was recently presented to General Chemical and others for "pioneering applications of chemical engineering principles and processes in extractive metallurgy of the Atomic Age metals."

General Chemical's significant contribution is the research and development of a new process for producing refined uranium hexafluoride for the Atomic Energy Commission. General will be the first company to refine uranium oxide compounds for the AEC in privately owned and operated facilities. Its new UF_6 plant, now under construction at Metropolis, Illinois, is scheduled to go on stream early in 1959.

General's new process for UF_6 embodies advances in fluorine technology that stem directly from its broad experience as the country's foremost producer of elemental fluorine, hydrofluoric acid, halogen and other fluorides . . . One more example of General Chemical serving the nation and industry—through leadership in fluorine chemistry.

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Check 2897 opposite last page.

that's interesting

Haven for brain-children

"Orphan ideas" are finding a home with the "orphan ideas" committee at Standard Oil Co. (Indiana). More formally entitled "Committee for Evaluation of Research Suggestions", group was formed to make sure no good idea dies

an untimely death. Unless a scientist finds his employer will give serious consideration to brain-children lying outside his own research field, he tends to stop offering them. Committee will merely evaluate. Any promising idea will be given a home for exploratory work with appropriate research division.

They were dispensable

Specially designed valve orifices and actuators, and different gas mixtures, now make it possible to dispense both oil- and water-base foods from pressurized cans. Products can be dispensed as either a spray or a stream, says Continental Can Co.

A heap O' readin'

It has been estimated that, were it not for abstracts, a present-day scientist would need to read 500 journals to keep abreast of his own and related fields. One of his biggest problems lies in technical literature published in foreign languages. In field of chemistry alone there are about 800 periodicals published in other countries not received

anywhere in the United States. As one step toward solving this problem, the Library of Congress, the John Crerar Library in Chicago, and the Special Libraries Association have cooperated in publishing titles of about 15,000 translated technical articles. (*Industrial Bulletin*, Arthur D. Little, Inc.)

A squirt for science

A perfume atomizer has aided chemists in understanding how genes dictate heredity. Molecules of desoxyribonucleic acid were "cut" into desired segments by the tearing force of air on the material going through the atomizer opening. Work was described by Dr. Liebe Cavalieri of Sloan-Kettering Institute at the 132nd National ACS Meeting.

Taming the sea lamprey

Control of the sea lamprey is nearing reality. Stream trials are being conducted, with preliminary evaluation described as "very successful", using 3,4,6-trichloro-2-nitrophenol. Indications were that final kill would top 95%. Effect of chemical on trout and other game fish was negligible. Chemical controls will

be used in conjunction with electric weirs. About 6000 chemicals were screened and tested during investigations which have been carried out over the past five years.

To page 5

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W-8

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SO

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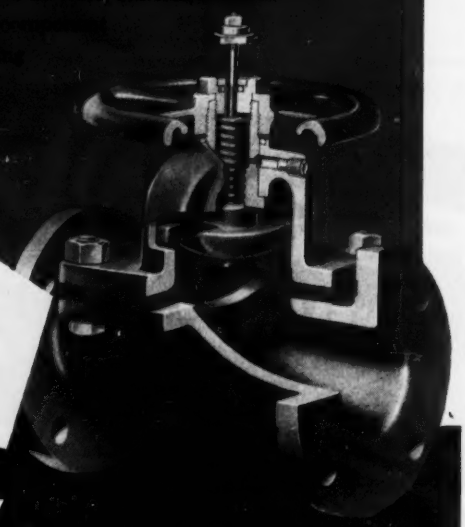
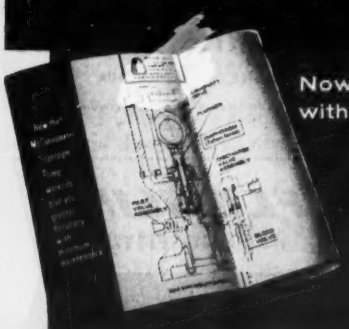


hills-mccanna company

THE PEOPLE WHO ____ AND ____ FLOW



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and Chemical Business

For the management team

Vol. 21 January 1958 No. 1

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Gift-wrapping a car

The citizens of Tulsa are burying a shiny new Plymouth. Car is to be a symbol of our civilization to pass on to citizens of the year 2007. To prevent deterioration, auto was wrapped in a moisture-vapor-proof bag composed of cotton cloth laminated to polyethylene sheeting, aluminum foil, and vinyl. Didyclohexlamoniumnitrite-treated paper was placed on the engine and interior areas to act as a vapor-phase rust inhibitor.

Orphan fruit

Parthenocarpic apricots, fruit produced without pollination, have been grown at University of California. Spray application of 2,4,5-T to naturally sterile flowers on trees produced a small crop of fruit. Chemical short-cut isn't likely to compete with nature's own method, since apricots produced were small and misshapen.

Language barrier?

Procedures in mathematics are helping to create shortage of engineers and scientists according to Dr. Karl Menger, Illinois Institute of Technology math professor. A survey showed only 13% of high school students go beyond most elementary phases of math. A thorough clarification of language of mathematics is needed to help students learn and keep them interested. (*Industrial Research Newsletter,* Armour Research Foundation)

NaCl goes artistic

A class in sculpture has found a unique use for salt. Hard blocks of NaCl are being used in place of marble for class sessions. The blocks are excellent for sculpting—and much cheaper. (*Spout,* Morton Salt Co.)

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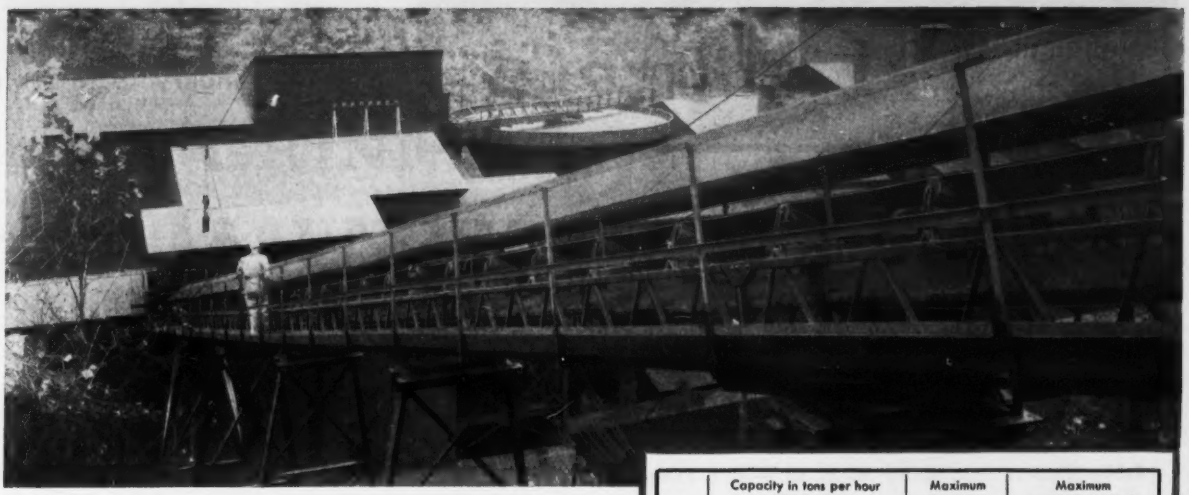

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24	50	75.0	100	4½	8	500	400
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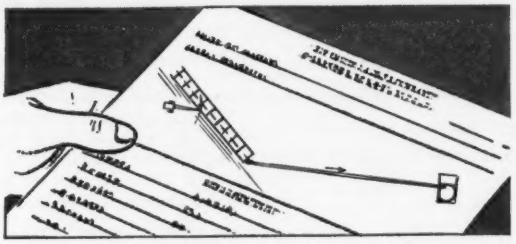

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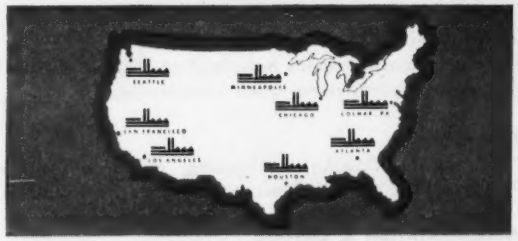

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chemical processing

highlights

January 1958 volume 21 number 1

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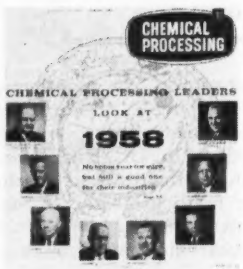
THIS MONTH'S COVER

Star-gazing is a "science" that has been practiced by man since the beginning of time. However, this year's LEADERS SPEAK series (page 29) is not the result of star-gazing by chemical processing industry leaders. It is the result of dealing with the cold facts to bring you this first-of-the-year glimpse into 1958.

To point up this contrast in methods of forecasting, the leaders are portrayed against a background design based on a 15th-century German woodcut of the zodiac circle. The cut, from the book *Hundert Kalender Inkunabeln,* is courtesy of Chicago's Newberry Library.



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over the editor's shoulder

Industry leaders view 1958

Top men of a number of major segments of the chemical processing field look at the year ahead in this issue . . . starting on page 29. As a whole, their views reflect definite optimism, although they do see some problems ahead.

Technology will continue to be one of the major driving forces in these industries. For without a strong research and development program, the field could not look forward to continued long-range growth.

Marketing and selling are other important factors that will be stressed in 1958.

The "profit squeeze" will of course be of major concern to all leaders in the chemical processing industries. Management's eyes will be directed to ways and means by which this press can be relieved.

The eight leaders who have prepared these "forecasts" have come up with some thought-provoking ideas for you. We recommend that you read them to get a good evaluation of what can be expected in 1958.

John C. Vaaler

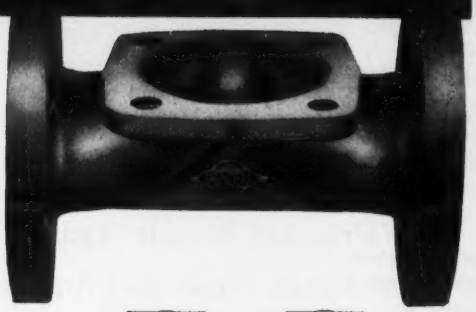
EDITOR

Outperforms other valves under SEVERE chemical conditions

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Backing Cushion

with TEFLON Diaphragms...

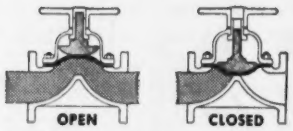


Grinnell Teflon Diaphragms are made by a special process which produces a better product of greater density, toughness and flex life.

The four case histories cited below demonstrate that Teflon offers a very high degree of chemical inertness to some of the most difficult chemicals which industry today must handle. Yet these are only a few of many success stories in the Grinnell files.

Diaphragm life depends on temperature, pressure and frequency of operation. Inquiries must include complete service data to receive prompt and careful attention.

Service Conditions	Saunders Valve Now Used	Service Life: Teflon Diaphragm	Service Life: Previous Valve
Case 1. Benzene hexachloride (30%-40% benzene, free chlorine); 120 to 130 F, 10 to 20 psi; operated 3 to 4 times daily	Glass lined bodies; Teflon Diaphragm; 1 to 3 inches	10 to 14 mos.	1 to 2 mos.
Case 2. 90%-95% HNO_3 plus 1.8% HF (specific gravity 1.62–1.77) 115 F in summer; 40 F in winter; 125 psi; operated 2 to 3 times daily	Durimet 20 body; Teflon Diaphragm; 1 to 3 inches	8 months	2 months
Case 3. $AlCl_3$ complex; ambient to 220 F; 0-50 psi; operated 1 to 2 times daily	Glass lined bodies; Teflon Diaphragms; 1 to 4 inches	9 months	6 months
Case 4. Sulphuric acid 85%; outside temperature; no pressure; operated 4 times daily	Iron bodies; Teflon Diaphragms; 2½ inches	Still in service after 1 year	3 weeks



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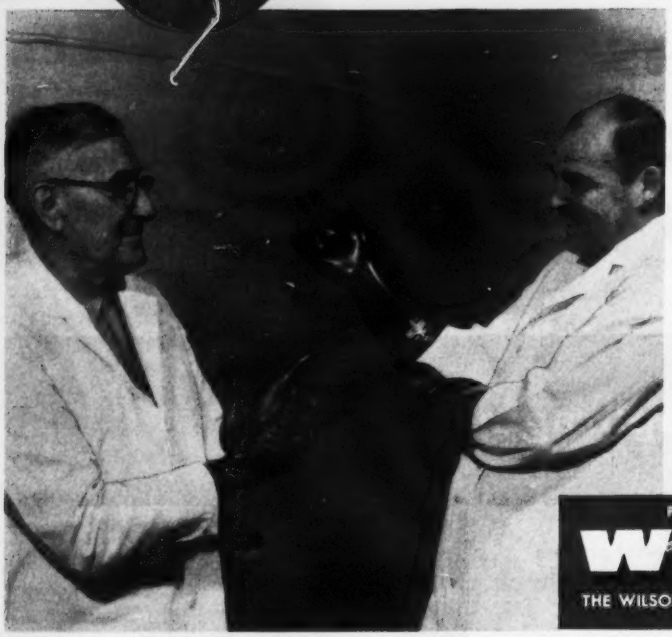
Why Balanced-Formula Neoprene ASSURES BETTER HAND PROTECTION



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Check 2904 opposite last page.

looking ahead to next month

Birth of a section —

Petrochemicals to start in February

The $5-billion petrochemical industry will be spotlighted in a regular editorial section starting next month. Although CHEMICAL PROCESSING has carried numerous petrochemical stories in the past several years, the remarkable growth and worldwide importance of this industry warrants a monthly section devoted to the industry.

Readers have requested more editorial designed particularly for the petrochemical industry. Petrochemical engineers will find this section planned especially to meet their needs. It will contain articles probing the meaning of petrochemical developments here and abroad, and there overall effect on the industry. There will be tips on how to cut costs, save labor, and improve products.

Petrochemical Editor Gordon Weyermuller will head up CP's new section

The February section will kick off with an article based on a research study made by CHEMICAL PROCESSING in cooperation with a number of petrochemical leaders. Report reveals that petrochemicals are under vigorous development in 20 or more countries — indicates the petrochemical industry will top growth rate for either the petroleum or chemical industry. As the petrochemical industry grows, the article points out, so will demand for instrumentation and other specialized equip-

ment needed in these plants. Included, too, will be individual comments from a number of petrochemical leaders on the outlook for the industry in the years ahead.

Does mixing, dispersing 30% faster

The manufacture of water-thinned acrylic paints often presents a tough pigment-dispersion problem. A feature in February CP's New Solutions section tells how Paragon Paint and Varnish Corp. whipped their problem, streamlined the operation, and saved valuable production time by switching to a high-speed, high-shear, turbine mixer.

Unit not only eliminated an entire pre-mixing operation, but also mixes and disperses the acrylic paints 30% faster. A complete before-and-after description of the process is given in article by associate editor Ted Meinhold and Paragon's technical director, Charles Friedman.

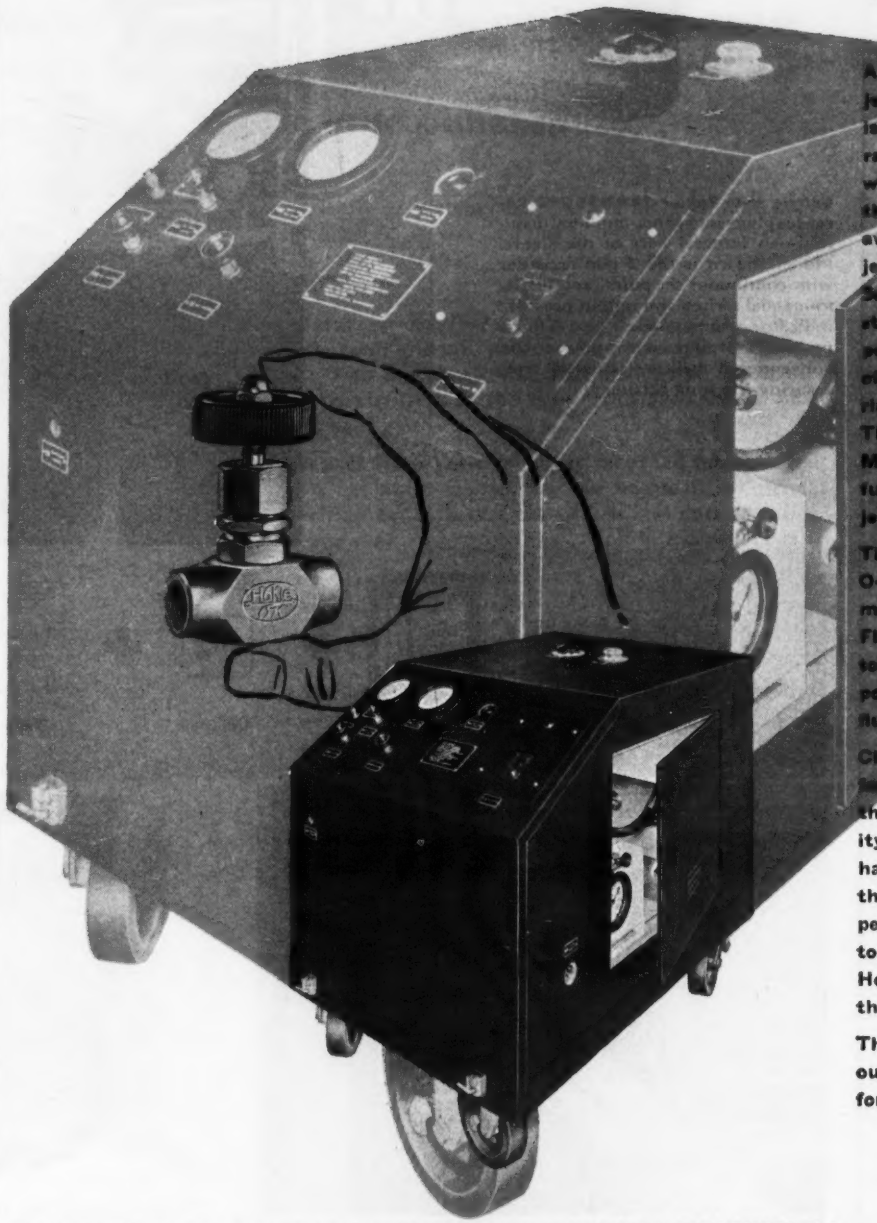
Higher living scales

Many economists, as well as thoughtful men in government and industry, know that, when too heavily taxed, private enterprise is undermined and cannot expand to provide lucrative employment.

In a revealing study, to appear in next month's CHEMICAL PROCESSING, Dr. Willford I. King, eminent economic authority, economist for the Committee for Constitutional Government, Inc., and long-time professor of economics at New York University, shows how constantly increasing capital investment has proved a dynamic force in "Raising the Workingman's Scale of Living."

Several charts graphically illustrate Dr. King's contention that we can have more better-paying jobs and a rising scale of living, yet still remain free men.

small valves are judged by the company they keep



Anyone who has had experience with jet fuel will tell you how difficult it is to seal in. Like alcohol in your car radiator, it'll find a way out where water won't—and a favorite spot is the valve packing. Most valves shy away from "keeping company" with jet fuel . . . but not Hoke's 270 Series needle valve with O-ring stem seal. Flight Support Incorporated of Linden, N. J., uses five of them to handle the elusive material as it passes through their Model TE-7001 Portable Static Fluid Test Machine. The equipment checks fuel system components on turbo-jet engines.

Thanks to the resiliency of the O-ring and the accuracy of the machined bonnet into which it fits, Flight Support found the 270 Series to be best for their use . . . not a pound of pressure nor an ounce of fluid gets by!

Checking out jet engines is pretty fast company for small valves . . . that's why producers of high quality test and production equipment have often turned to Hoke for valves that measure up to such strict dependability requirements. Users, too, recognize the craftsmanship in Hoke's valves, and look for them on the equipment they buy.

There's more to the Hoke story in our new catalog (MV-957). It's yours for the asking.

HOKE, INCORPORATED, FLUID CONTROL SPECIALISTS, 145 S. DEAN ST., ENGLEWOOD, N. J.

HOKE

Check 2905 opposite last page.

conventions and exhibits

Meetings and shows of interest to the chemical processing industries

January 2-3. American Chemical Society, Division of Industrial and Engineering Chemistry, Christmas Symposium, Case Institute of Technology, Cleveland.

January 27-29. American Society of Heating and Air Conditioning Engineers, Inc., annual meeting, Pittsburgh.

January 27-30. Plant Maintenance and Engineering Show, International Amphitheater, Chicago.

January 28-31. Society of Plastics Engineers, Inc., 14th ANTEC "Progress Through Plastics Engineering," Sheraton-Cadillac Hotel, Detroit.

February 4-6. Society of the Plastics Industry, Inc., 13th Annual Technical and Management Conference, Reinforced Plastics Division, Edgewater Beach Hotel, Chicago.

February 12-14. National Association of Corrosion Engineers, Tulsa Section, Ninth Annual Corrosion Short Course for Pipeliners, Mayo Hotel, Tulsa, Okla.

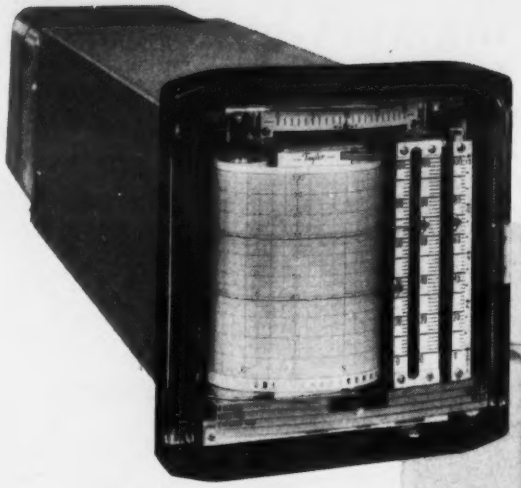
February 17-20. Technical Association of the Pulp and Paper Industry, annual meeting, Hotel Commodore, New York.

March 17-21. International Atomic Exposition, Inc., International Amphitheater, Chicago.

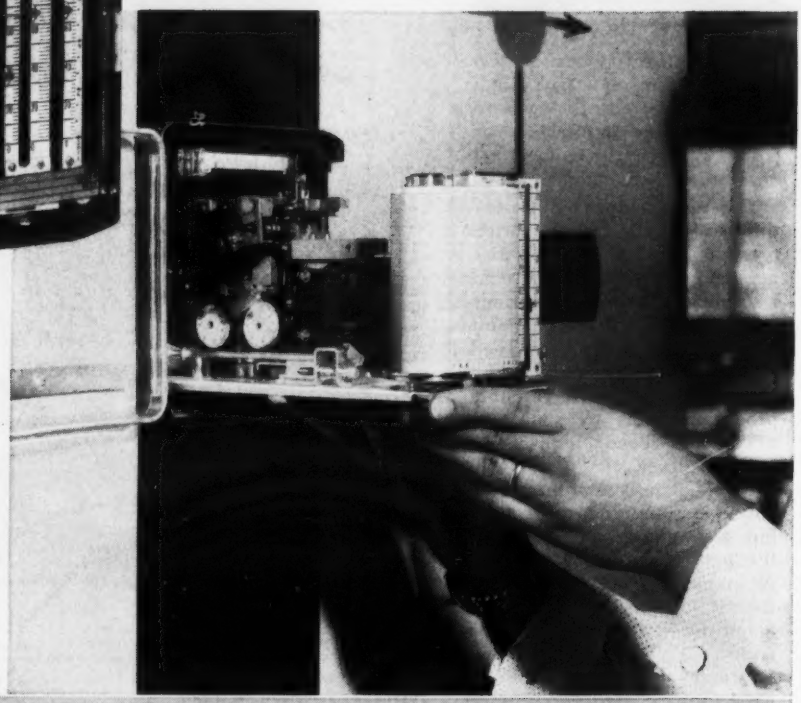
March 17-21. National Association of Corrosion Engineers, Annual Conference and Exposition, Civic Auditorium, San Francisco.

March 26-28. Society of Plastics Industry, Inc., Pacific Coast Section, Annual Conference Meeting, El Mirador Hotel, Palm Springs, California.

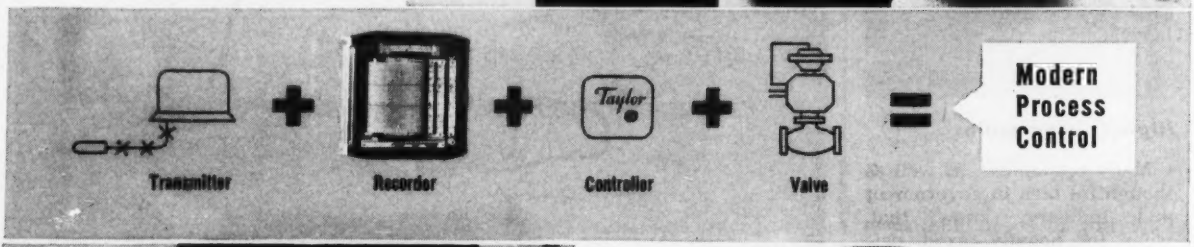
April 1-3. The American Society of Mechanical Engineers, Conference of ASME Division of Instruments &

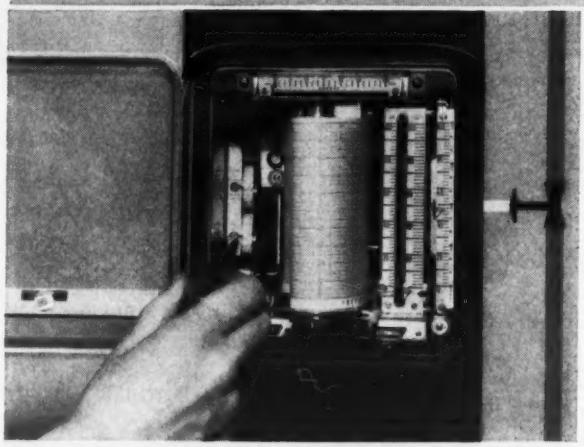


Never before

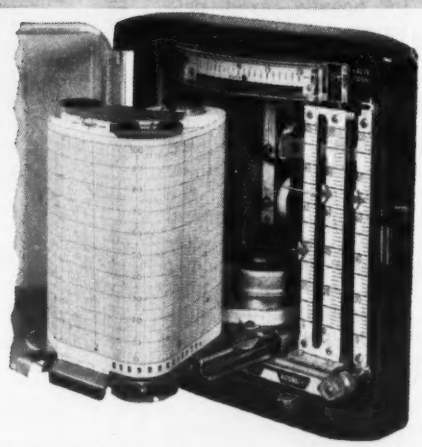


Unique new Taylor TRANSCOPE Recorder plugs into panel-mounted manifold—an integral part of the sleeve. Model shown is the 2 pen recorder with continuous set point, automatic-to-manual switch and output pressure indicator. "Servomatic" power pens provide 150 times more power than conventional bellows-actuated type, assuring life long accuracy.





Controller settings are made from the front while recording. Gain, reset and PRE-ACT* dials are calibrated in specific units. Eliminates blind adjustments—settings and results are seen in one spot . . . the front of the panel.



Most dependable chart drive. Chart is held in positive position and driven by rectangular pins. Timing control is absolute, because chart drum is driven by a Gilmer, chain-like belt. No jerking, because new Rulon bearings cut power needs in half. 4", 30-day chart gives 3 hour visible record.

. . . so Many Features in so Little Panel Space!

Taylor's new 90J Series TRANSCOPE* Recorder is a giant step forward in the development of convenience and compactness for modern instrument panels. No other recorder, regardless of size, puts so many features in so little panel space.

• **Front-of-Panel Control Settings** let you make adjustments easier, quicker, and better . . . from the front of the panel . . . while recording! You can clearly see what you are doing, and the results, because the record is continuous.

• **Stays on Automatic Control** while the recorder is removed for inspection. The unique Set Point Transmitter remains plugged in the case, providing continuous fully automatic control.

• **Complete Indicating Control Station** while recorder is removed. You see the variable. There's no need to shut down the process for instrument service or adjustments. Horizontal gage at top of recorder will show either process variable or air output to valve, as desired.

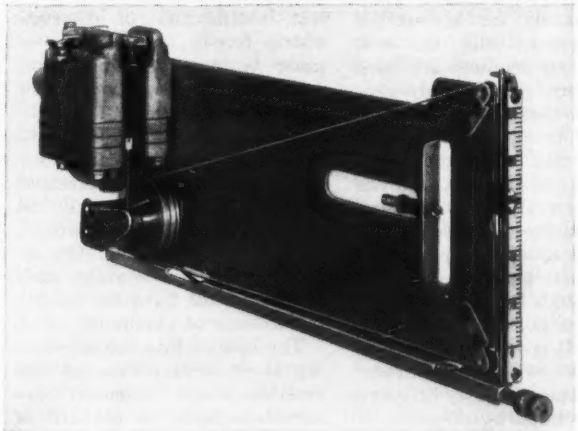
• **More Accurate Records.** Responsiveness to transmitter output is 0.1%; and because of the very small pneumatic displacement of the input capsule, the response is practically instantaneous. You see more minute process changes, so you can make optimum control setting. SERVOMATIC power pens assure accurate pen position.

• **Interchangeable Components** — all major assemblies, components and unit parts are completely interchangeable. Both the TRANSCOPE Recorder and Controller may be changed in the field from simplest to most complete form.

• **Receives Three Variables** to be recorded or indicated; has a set point transmitter, an automatic-to-manual switching lever, a cascade or process-output indicator, and many other features . . . all in a compact case.

• **Complete Cascade System** — a complete master-slave combination, in a smaller case than ever before. Perfect for direct control of composition, as well as the usual cascade control applications.

For further information about this revolutionary new recorder, see your Taylor Field Engineer, or write for **Form No. 98282.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.



Exclusive "Set Point Transmitter" allows continuous automatic control during recorder removal. The plug-in transmitter assembly may be removed and the control valve sealed in operating position. No need for process down time for instrument inspection or servicing.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Trade-Mark

Taylor Instruments
MEAN
ACCURACY FIRST

VISION · INGENUITY · DEPENDABILITY

Check 2906 opposite last page.

Regulators, University of Delaware, Newark, Delaware.

April 13-17. Third Pacific Chemical Exposition, sponsored by The California Section, American Chemical Society, Civic Center Exhibit Hall, San Francisco.

April 13-18. American Chemical Society, 133rd national meeting, Civic Center Exhibit Hall, San Francisco.

April 20-23. American Institute of Chemical Engineers, Sheraton-Mt. Royal Hotel, Montreal, Canada.

April 21-23. American Oil Chemists' Society, spring meeting, Peabody Hotel, Memphis.

April 27-*May* 1. The Electrochemical Society, Inc., Statler Hotel, New York.

May 1-8. American Society of Tool Engineers, 26th Annual Meeting and Tool Show, Philadelphia Convention Center, Philadelphia.

May 8-10. Western Material Handling Show, Great Western Exhibit Center, Los Angeles.

May 11-14. Fluid Controls Institute, Lake Placid Club, Lake Placid, New York.

May 19-23. National Fire Protection Association, annual meeting, Palmer House, Chicago.

June 9-12. National Materials Handling Exposition, Public Auditorium, Cleveland.

June 9-13. Fourth International Automation Congress and Exposition, Coliseum, New York.

June 22-25. American Institute of Chemical Engineers, 50th Anniversary Meeting, Bellevue-Stratford Hotel, Philadelphia.

September 9-12. Tenth National Chemical Exposition, International Amphitheater, Chicago.

Hallmark of Quality
HARRISBURG CYLINDERS
This trademark is your stamped guarantee of the highest quality high pressure gas cylinders obtainable. Harrisburg is the oldest and largest manufacturer of gas cylinders. From the beginning, durability has been of prime importance. When Harrisburg produces cylinders of either light weight chrome molybdenum steel or standard weight manganese steel it's done with an assurance of long service life and the ability to withstand hard use. This is why keen buyers always use Harrisburg cylinders.
More than a Century in Harrisburg 24, Pa.
HARRISBURG STEEL CO.
Division of HARSCO CORPORATION
TUBES
TRANSPORTS
FLANGES
COUPLINGS
Check 2907 opposite last page.

letters from readers

Continuing the series of articles CHEMICAL PROCESSING has carried the past several months on the vital subject of tariffs, here is a letter sent in by a reader in rebuttal to an article carried in our August 1957 issue. This reader says that —

LOW TARIFFS FAVOR US

Dear Sir:

Regarding the two articles on tariffs in the August 1957 issue of your magazine (pages 30 and 31), I would like to offer the following in rebuttal of the position taken by Dr. Lewis E. Lloyd. This article defends the maintenance of adequate tariffs to offset the advantage of foreign competitors through their lower labor costs.

There are three particular areas where my opinion differs emphatically from that of Dr. Lloyd: the dollar gap, national defense, and "fair competition." Since it is these three topics which most often arise in any consideration of tariffs, they can certainly bear close scrutiny.

Dollar Gap

The dollar gap, as it is called, is indeed much more than "merely an accounting figure which tells us how much of our products we have given away." If goods are given away, there is no liability incurred by the recipient. If on the other hand, the goods are sold to foreign nations and an equal amount is not purchased by ourselves, there is indeed a dollar gap, in that the foreign country does not earn enough foreign exchange from its exports to pay for its imports. It is just such a trade imbalance which encourages nations to place restrictions on their imports.

The United States, however, is in just the reverse position. Since 1937, the US has continuously exported more than it has imported, thus continuously accumulating a surplus of foreign exchange. Therefore, since the US earns more than it spends in trade, most of the countries who purchase from the US are spending more dollars than they earn. If, in addition to this, these countries choose to hoard what few dollars they have, they simply aggravate the situation and throttle trade.

Even a cursory examination of the foreign exchange reserve situation of such countries as the United Kingdom, Australia, Colombia, and many more of our South American allies indicate that their holdings of dollars are shrinking rapidly to a dangerously low level, thereby forcing them to curtail imports drastically. Thus, it is illustrated that the so-called dollar gap is a very real phenomenon evidenced by foreign exchange reserves.

It is this lack of reserves which forces a reduction of trade because of diminishing dollar purchasing power. In turn, the continued US balance of trade surplus helps to perpetuate this dilemma because there are interested parties who would sell all they can produce but would, in turn, buy nothing. On an international trade scale, such thinking only throttles the total volume of commerce.

The charge that the increasing short-term claims on US reserves could induce an economic collapse of the US is valid only on the assumption that these claims were deemed payable in gold over a short period of time by the creditor nations. The event of such a likelihood, however, is mi-

nute. In the present state of world affairs, the two most desirable currencies are the US dollar and the German mark. Both have exhibited stability and even relative appreciation in value. It might be added that both countries have increasing short-term liabilities. (Germany's nearly doubled between 1953 and 1955.) Consequently, all nations have attempted to retain as much of these currencies as possible in order to lend stability to their own currencies as well as insure secure relations with their trade partners.

Thus, the desire to receive gold instead of dollars could only come about either because the US economy had already collapsed or because the foreign nation wished to bankrupt its own reserve holdings by causing a US depression. Neither of these alternatives seems very likely. Consequently, fear of foreign claims on US reserves is not a legitimate argument against an increasing volume of trade.

National Defense

Dr. Lloyd's contention that the uncertainty of defense requirements is reason enough to stop capital and know-how from migrating from the United States is also based on a most specious foundation. This assumption is that the United States is entirely self-sufficient in an international conflict. World War II, regardless of the personal opinions concerning the contribution of any one ally, completely disproved this idea.

Although the volume of trade in relation to the Gross National Product of the US is only about 3%, such is not the case with our major allies, such as West Germany, 30%; Japan, 20%; the United Kingdom, 34%; Australia, 31%; and France, 20%. Since the military strength of these countries is inexorably linked with their economic stability, it behooves the United States for reasons of defense, as well as a preventive measure, to ensure the economic welfare of our allies. Certainly any action which would tend to jeopardize the free world could not be justified in this time of international unrest. Since it has already been recognized in US foreign policy that a strong world is a free world, it is about time that an economic policy is shaped to implement this resolution.

Fair Competition

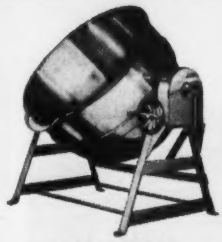
Although Dr. Lloyd demands a realistic view of trade policy, he loses sight of his objective in the area of "fair competition." The "ground rules" he establishes are unrealistic. They are not even observed in our own nation where we boast of free economic competition. The point in question is that Dr. Lloyd asserts that average labor rates in given countries must be equivalent or an "unnatural" advantage will favor the country with the cheapest labor. Were such a criterion to stand the test of practicability even within our territorial borders, internal tariffs would have to be set up to prevent the internal migration of industry because of advantageous labor cost.

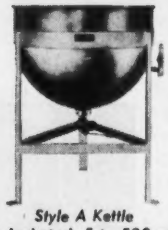
The case in point, is the movement of the textile industry from New England to the South. My contention is that the labor cost in an area, whether it be state or nation, is just as "natural" and characteristic to that locale as are the raw material resources.

We certainly regard the US standard of living and corresponding high wage level as characteristic of the economy. It is, however, an immutable fact that the benefits of a high standard of living dictate a corresponding sacrifice in the scope of competition. Thus the bulk-chemical industry — with its mass-production — is quite suited to our economy, with raw material costs being the basic competitive factor. On the other hand, the American watch industry has demonstrated its non-competitiveness because of high labor charges per unit and has been kept operating only through government subsidy in the form of a tariff.

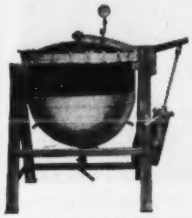
The United States must

LEE PRODUCTS
For Reduced Processing Costs

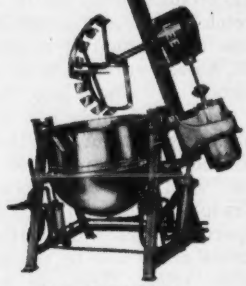

Style CW Kettle
⅓ Jacketed, 80 to 300 gal.


Style A Kettle
⅔ Jacketed, 5 to 500 gal.

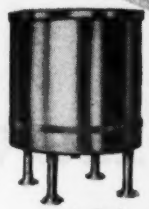
Style C Kettle
⅔ Jacketed, 5 to 100 gal.

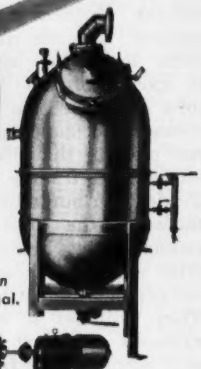

Pressure Kettle
⅔ Jacketed, 40 to 200 gal.

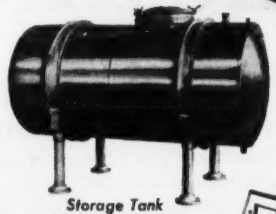
Style B Kettle
Full Jacketed, 10 to 300 gal.

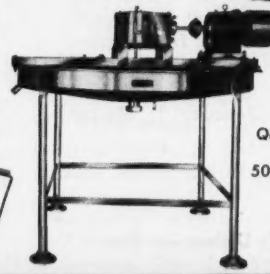

Style CW3T Kettle
with Center-Line Scraper Agitator, 80 to 300 gal.

KETTLES
TANKS
PANS


Pulp Tank
500 to 2,000 gal.

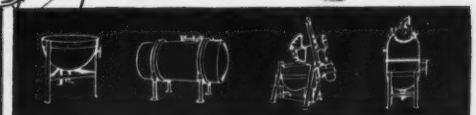

Vacuum Pan
30 to 500 gal.


Storage Tank
100 to 5,000 gal.


Quick Cooling Pan
50 to 200 gal.

Write for bulletins on any of the products illustrated.

LEE
METAL PRODUCTS COMPANY, INC.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE.


Kettles, Plain and Jacketed | Tanks, Processing and Storage | Agitators and Accessories | Vacuum and Pressure Equipment

418 PINE STREET, PHILIPSBURG, PA.

Check 2908 opposite last page.

recognize that its forte is mass production — that because of the benefits reaped, it cannot be an artisan nation. Yet, even today, the taxpayers subsidize uneconomical industries in this country by having to pay a higher price for goods than is necessary, due to both direct government subsidy as well as tariff. This is what is "unnatural."

Trade and the Economy

Importation of cheaper foreign products does not by any stretch of the imagination cause a reduction of wages. It will, however, result in a reallocation of labor into fields of endeavor which are truly competitive within the American economic framework.

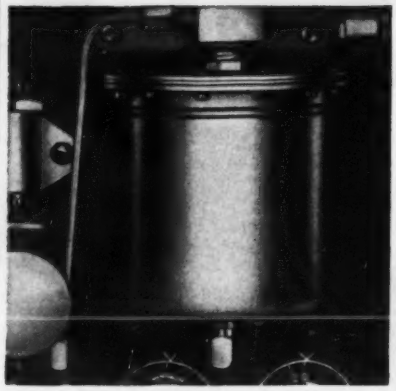
A well-known economic principle is that an excess of exports increases the national income many fold by the multiplier effect. This, in turn, encourages increased imports which, conversely, encourages increased exports. The net effect is a steadily increased volume of both imports and exports, with the national income increasing by a factor in excess of the dollar volume of both. Thus, trade increases the standard of living not only in the US, but also within the trading countries. Trade with our allies is a key factor in the Cold War, for economically healthy countries will not succumb to the enticements of Communism. They will set a world-wide example of how politically and economically free nations can benefit their citizens.

JARROTT T. MILLER

Engineer's Union — Pro

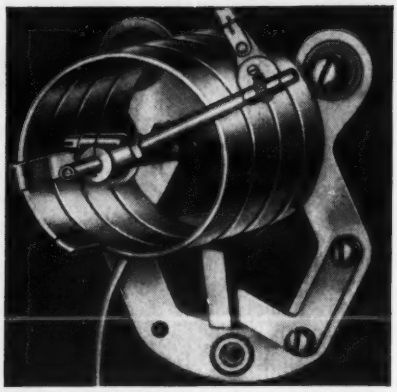
DEAR SIR:

I have just read the article "Engineers Should Not Join Unions" in October CHEMICAL PROCESSING, and was impressed with the lack of logic and perception demonstrated by the author. Perhaps these are the result of too-long an association with management consultants and management, and



RESET ACTION STOPS (*in cylinder*), another Bristol exclusive on reset models, assures optimum control recovery after sustained deviations of variable from set point.

ZERO DERIVATIVE SETTING, exclusive with Bristol on derivative models, can cut hours from set-up time for new process or new process conditions.



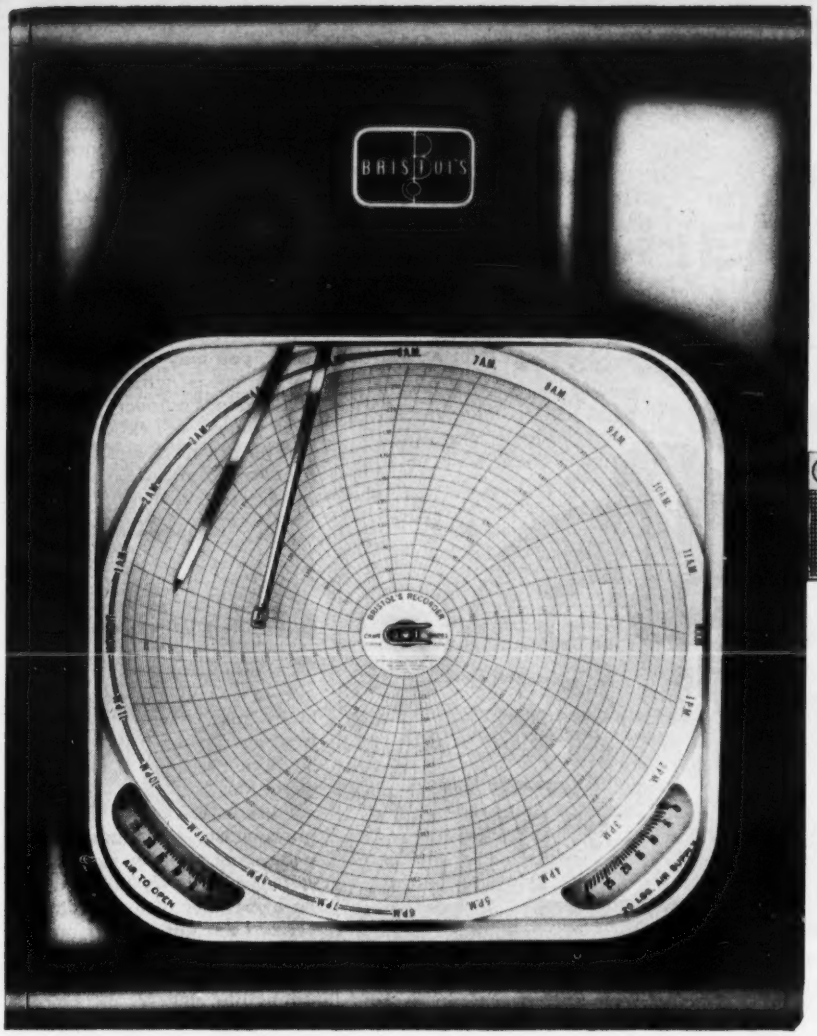
PRECISION BRISTOL MEASURING ELEMENTS, like this helical pressure element, promote accuracy of measurement and process control.

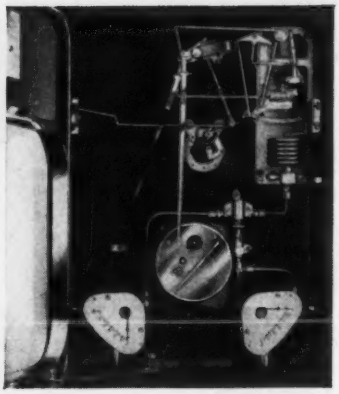
Your newest man can operate and

Several hundred standard models meet every process requirement including:

These problems:
1. Cascaded control
2. Selective control
3. Ratio control
4. Time program control
5. Pneumatic Transmission

These operating modes:
1. Fixed narrow band (on-off)
2. Proportional—to 100% and to 30%
3. Reset with wide band—rates 0.1 to 10 or 1 to 300 repeats per minute. Proportional band to 400%.
4. Derivative (rate)—Derivative time 0.2 to 20 min., plus Bristol exclusive zero derivative setting.
5. Reset plus derivative—with proportional band, reset rate, and derivative time as given above.





FIXED LINKS AND LEVERS provide built-in calibration in Bristol Series 500 Controllers. There's literally nothing to go wrong. This proportional temperature controller (chart removed) shows basic instrument simplicity.

maintain this controller

He'll catch on quick to the Bristol Series 500 Controller without a complicated, lengthy training period.

In fact, your plant can have Bristol Series 500 Controllers, even if you don't have a formal instrument department at all. Many small instrument users are doing this today. Yet the 500's performance is such that one of the largest, most widely known chemical companies in the country *just bought seventy 500's for its exacting processes.*

Two outstanding reasons contribute to this precision and trouble-free performance: (1) *Basic simplicity* of the operating mechanism—there's literally no way the instrument can get out of order or out of adjustment. (2) Bristol measuring elements insure the utmost accuracy in automatic control—for temperature, pressure, vacuum, draft, absolute pressure, liquid level, humidity, pH value, electrical measurements, or any variable.

Another big simplification: You can exactly calibrate the Series 500 Controller *with only one single adjustment, even after complete disassembly and reassembly with replacement of parts.* Close tolerances on all working parts plus the built-in calibration of the fixed-link-and-lever mechanism make this possible. And you can always interchange parts with those of any other Series 500.

Get complete data on Bristol Series 500 Pneumatic Controllers now, before you order another instrument. You'll find a model for every purpose, every mode of control. Write for bulletin A 130, The Bristol Company, 141 Bristol Road, Waterbury 20, Conn. 7.49

BRISTOL *TRAIL-BLAZERS IN PROCESS AUTOMATION*

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 2909 opposite last page.

insufficient contact with present-day working engineers.

The theory of engineers negotiating individually with management on salaries and working conditions is a fine one. However, the fact is that most engineers work in large organizations and, under the circumstances, opportunities for individual negotiation are relatively non-existent. Each organization has its own salary scale; while there is usually some latitude, the tendency is to rate men mighty close to the sacred "curve" for the area or the industry. The engineer is told that these are the "going rates." Engineers are, by and large, treated pretty much the same as any other hired help. I'm afraid that this is inevitable when the number of any category of employees grows beyond a relatively few. Perhaps I should remind Mr. Wilson that this is one reason why trade unions were formed.

It seems to me that Mr. Wilson is just restating, as many others have done before, that we engineers all be good little boys and keep uppermost the interest of our employers, even though some of us are not as well paid as tradesmen (he brought this up, not me). And if we don't raise our employers' blood pressure by bargaining collectively, and conform to the edicts of employers on working rules (conformity required by an employer being somehow more palatable than that required by a union) and put in all kinds of uncompensated or even unrecognized overtime (" . . . the time and effort involved in the work of a professional is not regulated by a clock."), then we may hope to be considered a part of management and be compensated according to Mr. Wilson's law of supply and demand. Perhaps he has not heard that this law is curiously inoperative for experienced engineers.

If we swallow all this nonsense Mr. Wilson has rehashed, we deserve salaries below that of tradesmen; we just can't be very smart.

It seems to me that one big, though indirect, advantage

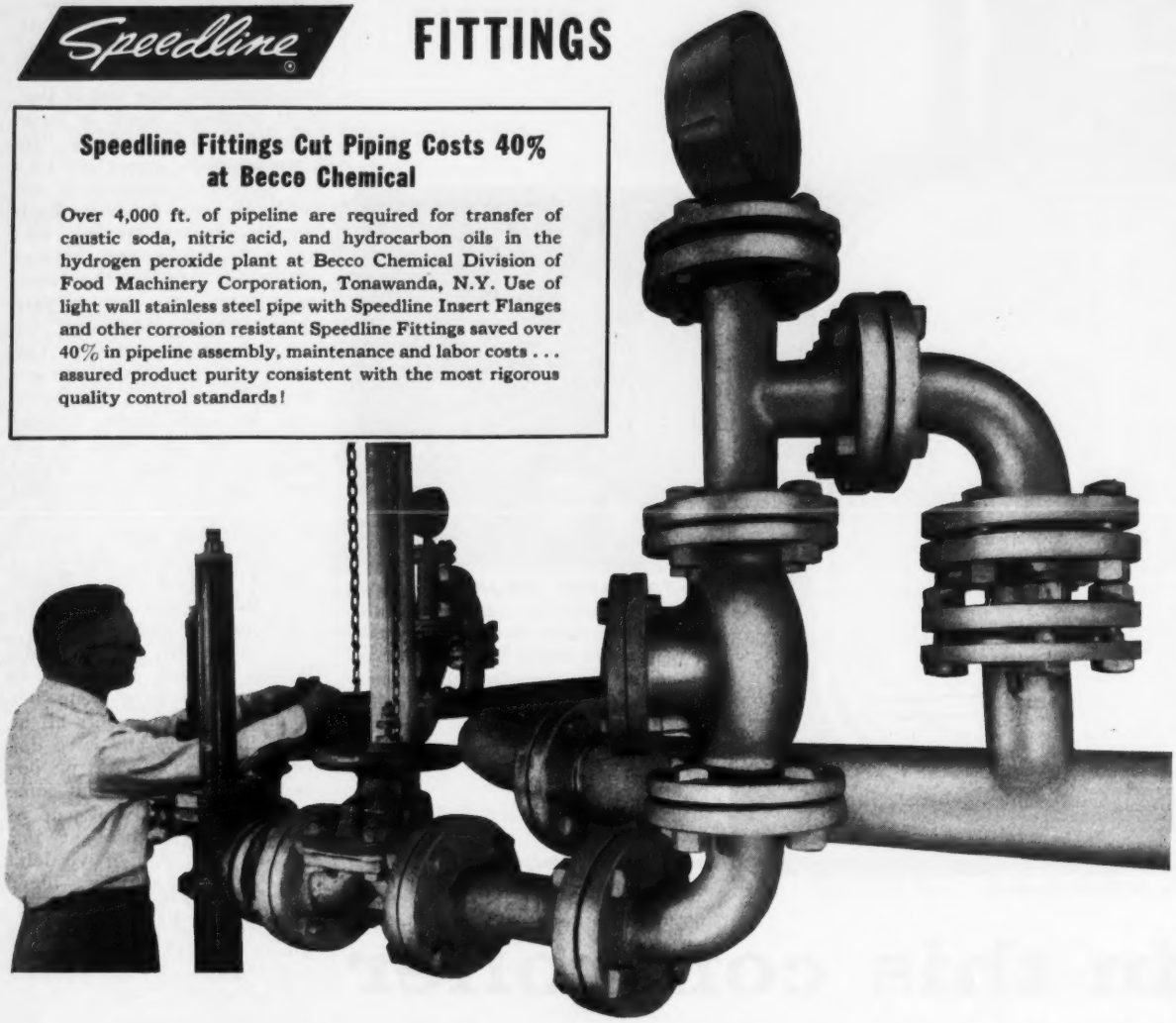
Where corrosion resistant piping is required

PROCESS PLANTS SPECIFY

Speedline FITTINGS

Speedline Fittings Cut Piping Costs 40% at Becco Chemical

Over 4,000 ft. of pipeline are required for transfer of caustic soda, nitric acid, and hydrocarbon oils in the hydrogen peroxide plant at Becco Chemical Division of Food Machinery Corporation, Tonawanda, N.Y. Use of light wall stainless steel pipe with Speedline Insert Flanges and other corrosion resistant Speedline Fittings saved over 40% in pipeline assembly, maintenance and labor costs . . . assured product purity consistent with the most rigorous quality control standards!



Leak-Proof Joints without Welding—No residue traps form at points of juncture; process solutions are guaranteed *free* of "tramp iron" or other impurities. No threading, vanstoning or welding with a Speedline Insert Flange—a wrench and a Speedline expander assures a tight, leak-proof joint every time—without danger of contamination from welding operations.

"Tangential Feature" Simplifies Assembly and Modification—The extra straight section on *every* end of *every* Speedline formed fitting permits greater clearance for easier, faster joining—with *or* without welding—easier disassembly of pipelines when layout changes are required.

Discover how you can reduce costs wherever corrosion resistant piping is required at your plant . . . with Speedline Fittings, designed especially for use with low cost, light wall Schedules 5 and 10 stainless steel pipe.

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Speedline

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STAINLESS STEEL FITTINGS

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Check 2910 opposite last page.

in unionization of engineers would be to force management to examine our role more critically. And, particularly if we were more highly paid, they might give more attention to using us more effectively. To many thoughtful and conscientious engineers this would be a most important point.

If you care to publish this letter, you may do so provided my name is withheld. As a non-union engineer with fifteen years of experience, I still do not have sufficient job security to permit such outspoken criticism.

NAME WITHHELD

Engineer's Union — Con

DEAR EDITOR:

Thank you for presenting both sides of "Unionism for Engineers." Much is to be said for either side — I favor the no-union side.

I graduated as an industrial pharmacist, a sort of engineer, and, surely, a professional man. I do not want to be a member of any union.

No, I am not *against* unions, because beyond any doubt they have accomplished an intangible degree of success, especially in upgrading the laboring man. However, this same success can be accomplished by proper labor-management relations, the following of the "Golden Rule", and not making $'s almighty.

As Mr. Wilson points out, (CP, Oct. 1957, p 27) the power created by unions sooner or later dispels with individualism and creates a situation which "is completely inconsistent with professional activity."

The professional man must realize times have changed. By being consistent with good moral judgment, we do not need to create a welfare state in which we reap undeserved benefits.

Personally . . . I want to make my own future without aid of unionism. Professional societies, yes, but not unions.

DAN R. BLANKENSHIP

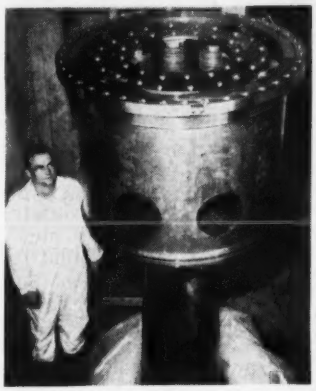
The Central Pharmacal Co.
Seymour, Indiana

nuclear notes

Significant news about atomic energy

Filters for atomic subs handle 760,000 gph

Giant filters for use on atomic-powered submarines are being built by The Cuno Engineering Corporation, Meriden, Conn. Capable of handling 760,000-gal water per



Filter for USS Triton stands over 7½-ft high and weighs nearly 2 tons

hr, the stainless steel units can remove particles as small as three one-thousandths of an inch in diam. The filters are used to remove foreign matter from the reactor system before the nuclear core is installed.

New AEC headquarters dedicated

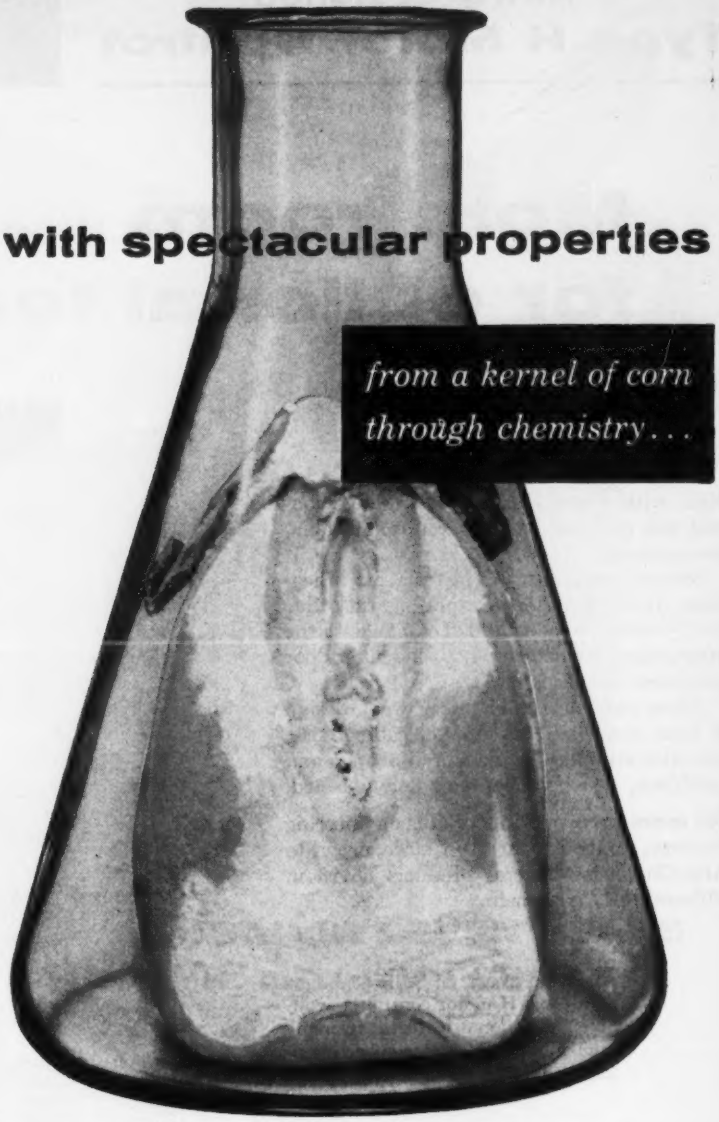
AEC's new headquarters building near Germantown, Md., has been dedicated. Commission's Washington staff is scheduled to be transferred to new location this month.

Radioactive waste disposal ever-growing problem

"Tailoring the disposal of radioactive waste to meet all safety requirements is an ever-growing problem . . . ", said Albert L. Smith, US Naval Radiological Defense Labora-

To page 19

STARCHES with spectacular properties



☐ **DRY-FLO**—a *hydrophobic* starch powder that flows like a liquid. It is water repellent, yet absorbs water vapor without losing mobility. USES: Dusting powder, fluidifying agent, lubricating agent, detackifier, emulsifier, water repellent film.

☐ **CATO STARCHES**—starches that carry a *cationic* charge as an integral part of their polymeric structure. Unusual properties include a strong affinity for negatively charged surfaces. USES: Size, binder, flocculant, stabilizer, thickener.

☐ **NAPONS**—a series of starch derivatives with a controlled balance of hydrophilic and hydrophobic groups. Products show a unique combination of *emulsifying*, thickening, and film forming properties. USES: Size, emulsifier, thickener.

☐ **NU-FILMS**—a series of *hydrophilic* starch derivatives which are polyelectrolytes. Dispersions offer excellent stability. Different viscosity grades are available. USES: Thickener, finger paints, lotions, leather pasting, sizing.

☐ **VULCAS**—a series of modified corn starches with *controlled swelling* ability. Supplied with varying degrees of toughness. USES: Food thickener, cosmetic powders, separator in dry cells, textile printing paste thickener.

☑ **CHECK THE STARCHES** you'd like to know more about for use in:

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STARCH PRODUCTS INC.

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Check 2911 opposite last page.

Newly designed
Type H Motor Control

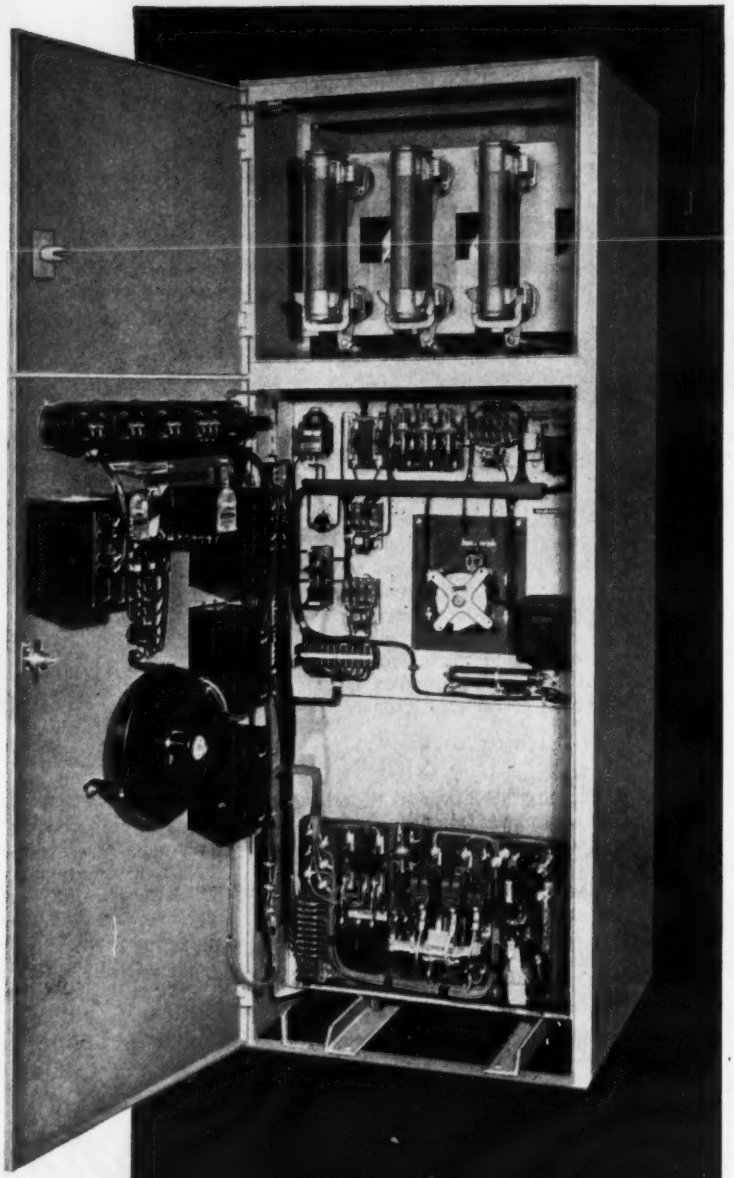
More room for optional features

Now, with Allis-Chalmers high voltage control, you get more panel space for additional components.

Meters, pushbuttons, instruments, rheostats, indicating lights, relays, and other components can be installed—thanks to the ample space available on both the outer door and inner barrier.

Along with more room, this new A-C design is front accessible, has smaller cabinet size, provides ultimate in protection for men and machines, and has been completely tested.

For more information on this engineering advance, contact your A-C office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



All this area on Allis-Chalmers new Type H motor control is available for optional features. In many applications, this extra space eliminates the need for an extra cabinet.

Removable panel, on which control devices are assembled, is mounted on inner barrier. Entire panel may be quickly removed for inspection and maintenance.

ALLIS-CHALMERS

A-5519

NATIONAL ELECTRICAL WEEK
FEB. 9-15, 1958

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 71.

For more information on product at left, specify 2912 see information request blank opposite last page.

From page 17

tory, in a speech at the Eighth National Conference on Standards in San Francisco.

According to Smith, liquid forms having varying levels of radioactivity are creating the most problems. Major objectives being carried out in waste disposal field are: 1) develop improved systems for safe handling and ultimate disposal; 2) determine quantitatively dilution or concentration factors for radioactivity in environment to establish standards for release of particular effluents to the ground, atmosphere or surface waters.

Cites need for standardization of nuclear safety regulations

If private industry is to be encouraged in the development of atomic energy, standardization of safety regulations in this field is a must, says A. C. Blackman, Chief, Division of Industrial Safety, State of California.

Speaking recently in San Francisco, Blackman emphasized that there are many different sources of ionizing radiation, and also many agencies of government which are concerned with the various aspects of radiation.

He pointed out that although progress is being made, there is a need for continued cooperation of the various state and federal agencies, if the various levels of government are to discharge their duty toward the public in preventing undue hazards.

Offer commercial quantities of anti-radiation agent

Schwarz Laboratories, Inc., of Mount Vernon, N.Y., has announced the availability of commercial quantities of AET, 2-aminoethylisothiouronium bromide·hydrobromide. Compound is reported to hold great promise for protection against radiation damage.

Experiments carried out on monkeys and mice show that

SWARTWOUT AutroniC® INSTRUMENTATION

SECOND MAJOR BREAKTHROUGH IN SEVEN YEARS
THE UNITIZED AUTRONIC CONTROLLER

Swartwout revolutionized process control when it first introduced the AutroniC Control System in 1951. All limitations of the past were immediately swept away.

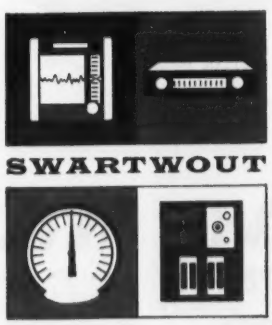
Impossible performance specifications became a reality. Zero hysteresis, infinite sensitivity and no signal lag became tangible qualifications that *only* this new instrumentation concept could fulfill.

Again in 1957, Swartwout amazed industry by producing the Unitized AutroniC design. Years ahead in its field . . . no control instrument has ever been as completely unitized. No controller has ever been as *practically* unitized in terms of flexibility and the simplest, easiest maintenance ever.

Every component section plugs in. They're all interchangeable. A simple indicator becomes a sophisticated recorder-controller in minutes and without tools.

In performance . . . maintenance . . . flexibility, you're years ahead with AutroniC Instrumentation. And, you'll stay ahead because of Swartwout continuing leadership in the control field.

4 new bulletins describe the Unitized AutroniC System. Request Bulletin Series A-801.



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Check 2913 opposite last page.

Pulverizing

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CHEMICALS

to high fineness

with the RAYMOND ROLLER MILL

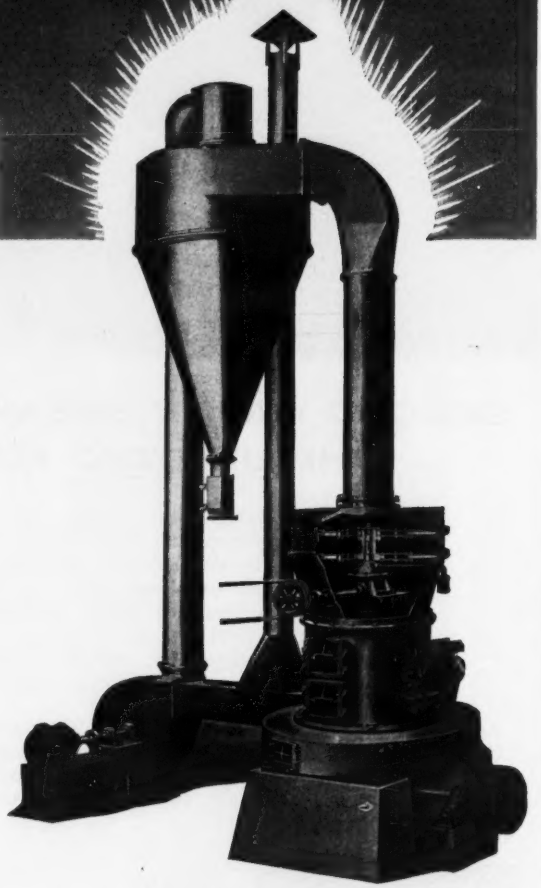
Manufacturers of fine chemicals, colors, fillers and many other powered materials, used in the process industries, are finding it possible to improve the quality and marketability of their products with the Raymond *whizzer-type* Roller Mill.

This modern machine is widely used for pulverizing iron oxides, titanium pigments and mineral paint colors. These are ground to extreme fineness and uniformity up to 99.9% passing 325 mesh. Desirable product characteristics, such as even dispersion, low oil absorption and tinting quality, are developed by this method of production.

Close control of fineness by means of whizzer separation makes this unit valuable for grinding quality grades of lithopone and white lead, as well as clay, kaolin and limestone fillers for the paint, paper and rubber industries.

Let Raymond engineers assist you in selecting the equipment you need for making the finest powdered products to meet today's strict specifications

Write for Raymond Catalog No. 79



RAYMOND ROLLER MILL with Whizzer Separator. One simple adjustment provides wide range classification.

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COMBUSTION ENGINEERING-SUPERHEATER LTD., Montreal, Canada

Check 2914 opposite last page.

when substance is administered prior to exposure to radiation, all animals survive, while untreated ones die. Tests are now being conducted on human beings. Developed at Oak Ridge, the material is available in crystalline and tablet forms.

(Further information about AET may be obtained from Schwarz Laboratories, Inc., 230 Washington Street, Mount Vernon, N. Y.)

Check 2915 opposite last page.

Plutonium to be used as fuel in reactor

Plutonium will be used as fuel in the AEC's new test reactor near Idaho Falls, according to Louis H. Roddis, Jr., deputy director of AEC development division. The US has billions of dollars of the man-made atomic explosive on hand. Up to now, engineers have not been able to perfect means of using it to fuel atomic furnaces.

226-curie-per-gram cobalt source

Scheduled for use in cancer radiation therapy, a 226-curie-per-gram cobalt source was recently removed from the MTR, operated by Phillips Petroleum for the AEC. It had been irradiated for a period of three years and eight months. Weighing 11.7 grams, it has a total activity of 2640 curies. Until now, the highest specific activity induced in a cobalt source was 100 curies per gram.

AEC gets 31 proposals on gas-cooled reactor

The AEC has received 31 proposals from US architect-engineering firms to conduct engineering design of a natural uranium, gas-cooled, graphite-moderated nuclear electric power plant of 40,000 electrical-kw capacity. A report on the design, including

cost estimates and schedule of construction, is to be submitted by AEC to Joint Committee on Atomic Energy of the Congress, not later than April 1, 1958.

Nuclear manpower needs to hit 16,000 by 1960

Survey of scientific and engineering manpower needs of private atomic energy industries, has been completed by the Atomic Industrial Forum, Inc., of New York, under contract with AEC. Survey shows an estimated 7000 such personnel were employed in September 1956 in all types of atomic energy activity supported by private industry. About 9000 were employed in July 1957. Demand is expected to be 16,000 by 1960.

Brazilian reactor startup first in Latin America

The first sustained nuclear reaction fission ever achieved in Latin America was marked by the startup of the Institute of Nuclear Energy's research reactor at Sao Paulo, Brazil. Built by Babcock and Wilcox Company, the reactor is located on the University of Sao Paulo campus and is designed to produce 5000 kw of power.

Giant insurance program for atomic energy

A total insurance coverage of $125 million has been developed for privately owned nuclear energy installations, according to Hubert W. Yount, executive vice president of Liberty Mutual Insurance Company. The third party liability policy — the broadest written in American insurance history — is specifically prepared to tie in coverage with the Federal indemnity legislation, approved Sept. 3. This makes available $500 million of US Federal indemnity to reactor operators in excess of insurance required under the Federal Indemnity Act.

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ELIMINATES FLANGE FAILURE!

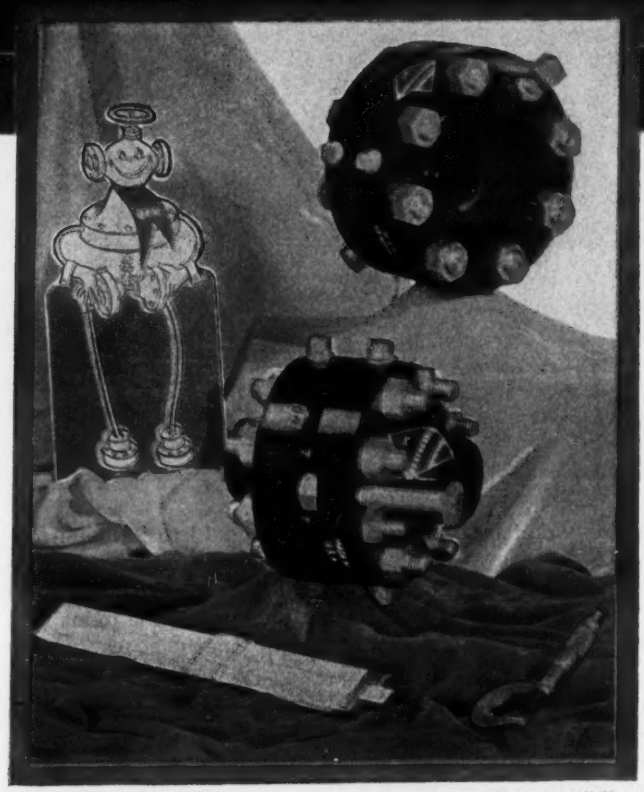
Flange failure is expensive! Shutdown time and flow stoppage, to say nothing of damage costs and replacements, can eat up months of profits in no time at all!

But OTM's modern scientific methods — Reflectoscope, Magnaflux, tireless checking and rechecking, protective packaging — prevent all but the perfect flanges and fittings from reaching your job!

Exhaustive testing plus highly skilled machine work result in unequalled Blue Ribbon quality.

FREEDOM FROM FLANGE AND FITTING FAILURE **GUARANTEED***

*by OTM exclusive guarantee and mill test report



A-11-'57

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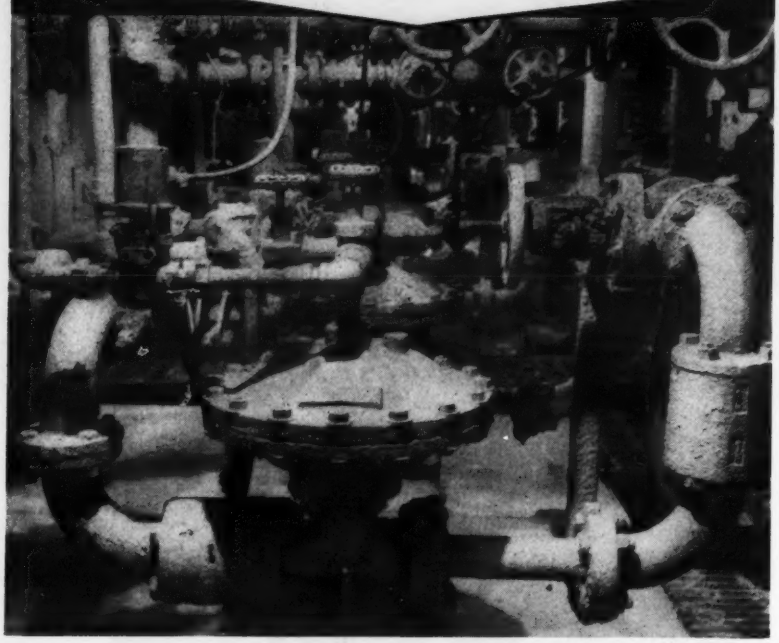
Check 2916 opposite last page.

Solved... **Another "Problem Pumping" Job at Owens-Corning Fiberglas**



Handling water base paint and operating 16 to 24 hours per day . . . every day, these Oliver Diaphragm Slurry Pumps installed at the Newark, Ohio plant of the Owens-Corning Fiberglas Corp. are employed to maintain pressure in the paint feed line to spray gun manifolds for the spraying of acoustical tile block.

The Owens-Corning installation is but another example of the ability of Dorr-Oliver Pumps to provide the solution to "problem pumping" applications. With the diaphragm operating pneumatically there is *no stuffing box*, thus *no leakage*. The reliability and low maintenance features inherent in this link-free design can readily be interpreted in terms of reduced operating costs. In addition, the O.D.S. is capable of handling materials ranging from clear liquid to slurries containing up to 60% abrasive solids.

For a free copy of Bulletin No. 5003 covering the Oliver Diaphragm Slurry Pump, just drop a line outlining your particular problem to Dorr-Oliver Incorporated, Stamford, Connecticut.

DORR-OLIVER
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STAMFORD · CONNECTICUT · U.S.A.

Check 2917 opposite last page.

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Proceedings of 1957 Air and Water Pollution Abatement Conference

The complete proceedings of the Manufacturing Chemists' Association's 1957 Air and Water Pollution Abatement Conference are contained in 131-page book. Dealing with this subject, there are a total of 14 papers that were presented by recognized leaders in the field.

Included are papers on dispersion determination, evaluation of air pollution statutory approaches, techniques for biochemical oxidation, assimilation of organic pollutants, developing company interest, multipurpose incineration, sedimentation plant design, and others.

The book is well illustrated with photographs, charts, and drawings. Registration list of individuals attending the conference is also included.

To obtain "Proceedings of 1957 Air and Water Pollution Abatement Conference" remit $2.00 direct to Manufacturing Chemists' Association, Inc., 1625 Eye Street, Northwest, Washington 6, D.C.

Handbook of Chemical Data

This concise handbook — 4 x 6 x 1" thick — has 630 pages of useful information that appears to be of particular value to the analytical chemist.

Atomic weights and the periodic table are right in the front of the book, where they should be. Specific gravities and densities of solutions are next, then data and corrections for gases and boiling points. Following this comes solubility data of many compounds.

Starting on page 198, and continuing for 290 pages, are tables of properties of minerals, inorganics, and organic chemicals. Text and tables covering qualitative analysis cover the next 87 pages. The final 56 pages include conversion tables, log and math tables, and the index.

Handbook is edited by F. W. Atack, President, Industrial Process Development, Ltd., Kingston, Ontario. Printed in Great Britain.

To obtain "Handbook of Chemical Data" remit $6.75 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

Flotation

Reviewed by
REYNOLD Q. SHOTTS
Professor of Mining Engineering
University of Alabama

Although this is a second edition of a standard text first published in 1932, Professor Gaudin has actually written a new book that accurately reflects the enormous advances which have been made in the scientific substructure of flotation theory since 1932. Whereas five chapters (85 pages of 535) were devoted to the scientific basis of flotation in the first edition, the remaining pages being essentially a discussion of the application of flotation to mineral preparation as an art, eight chapters (229 pages) are essentially flotation theory in this second edition. Only seven chapters (162 pages of 554) are concerned with the art.

Abstraction of the litera-

ture is excellent and, judging by the chapter-end references, quite complete. References to articles published as late as 1955 are noted. Undoubtedly Professor Gaudin's is the most complete and authoritative recent book on the subject.

At the same time the new book is hardly an undergraduate text as was the first edition. It is unlikely that the author intended it for this purpose. The 1957 edition presupposes rather more familiarity with physical-, colloidal-, and electro-chemistry than the undergraduate has. Many of the references to quantum mechanics and atomic theory are rather beyond his depth. The book, as a reference to supplement undergraduate lectures or some too-brief text material (for a one-semester, three-credit course) such as the three chapters in the same author's "Principles of Mineral Dressing" (1939), should be most satisfactory.

To obtain "Flotation", remit $12.50 *direct to McGraw-Hill Book Company, Inc.,* 330 *West* 42nd *Street, New York* 18, *New York.*

Thermodynamics for Chemical Engineers

This 507-page book covers thermodynamics from both the engineer's and chemist's viewpoint. As the authors point out, the broader point of view makes possible translation of findings from chemical laboratories into economical production methods of the modern industrial plant.

Unlike the first edition, this second edition includes a considerable number of solved illustrated problems, making self-study much easier. The book also includes an expanded treatment of fluid flow. Descriptive chapters on power cycles, engines, turbines, and refrigeration are included.

The authors, H. C. Weber, and H. P. Meissner, are both professors of chemical engineering at Massachusetts Institute of Technology. Most of

Valve diaphragm of R/M TEFLON* helps speed production of polio vaccine!

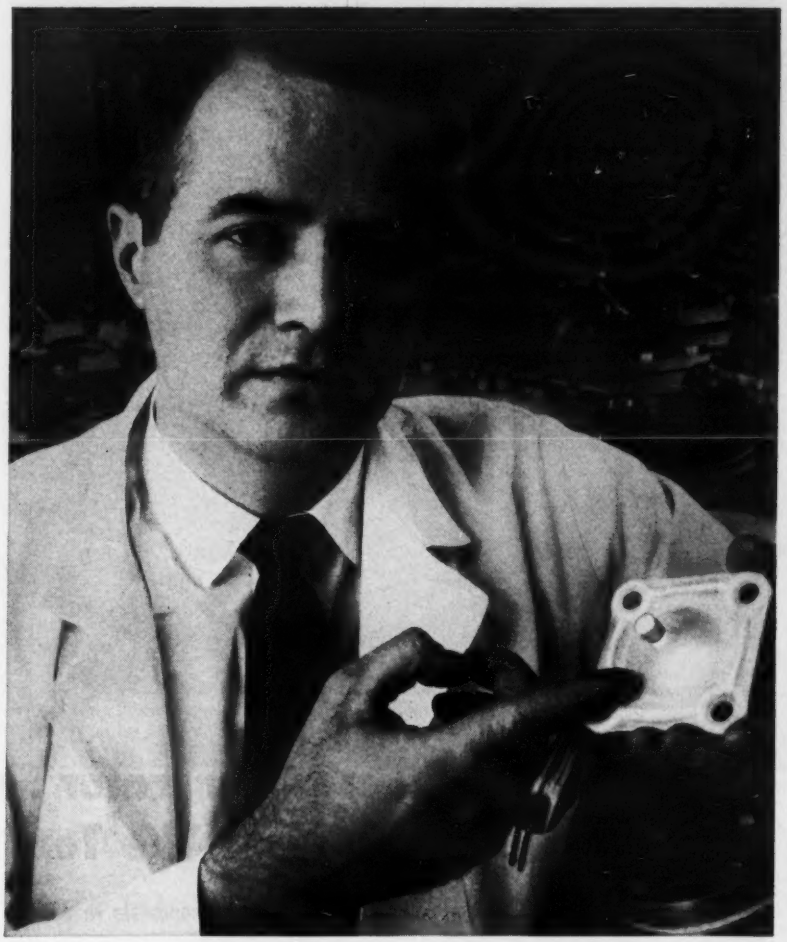
Here's how Raybestos-Manhattan cooperated with a customer to make possible faster production of vitally needed Salk polio vaccine.

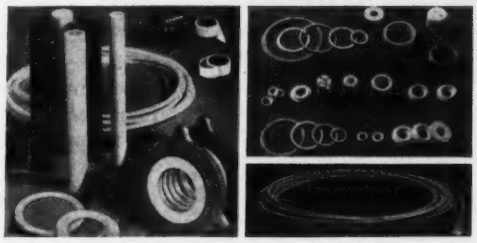
Salk vaccine is 20 days in the making, requires another 110 for testing. During this time the portable processing tanks must be sealed off from all possibility of contamination. Processing temperatures range from 5 to 150°C. Diaphragm valves were chosen for this work because they make possible complete cleaning and sterilization.

The solid valve diaphragms originally used were unable to withstand the extreme operating conditions involved. R/M "Teflon" was selected for the task because of its strength, flexibility, chemical inertness, and capacity to endure—unchanged—the wide range of temperatures necessary.

R/M worked closely with the customer and promptly developed a new method of molding a "Teflon" valve diaphragm ideally suited to this exacting need. The new "Teflon" diaphragm was much thinner than the one formerly used, with improved flex life that permitted a greater number of manufacturing cycles—this without danger of valve failure at a critical point in the process.

*A DuPont trademark





Other R/M products for the chemical industry include flexible thin-wall "Teflon" hose; custom-machined parts; rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded tubes and rods; gaskets, expansion joints, and flexible couplings; bondable tape and sheets for linings; Raylon (R/M trade name for mechanical grade "Teflon") which has many characteristics of virgin "Teflon."

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RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

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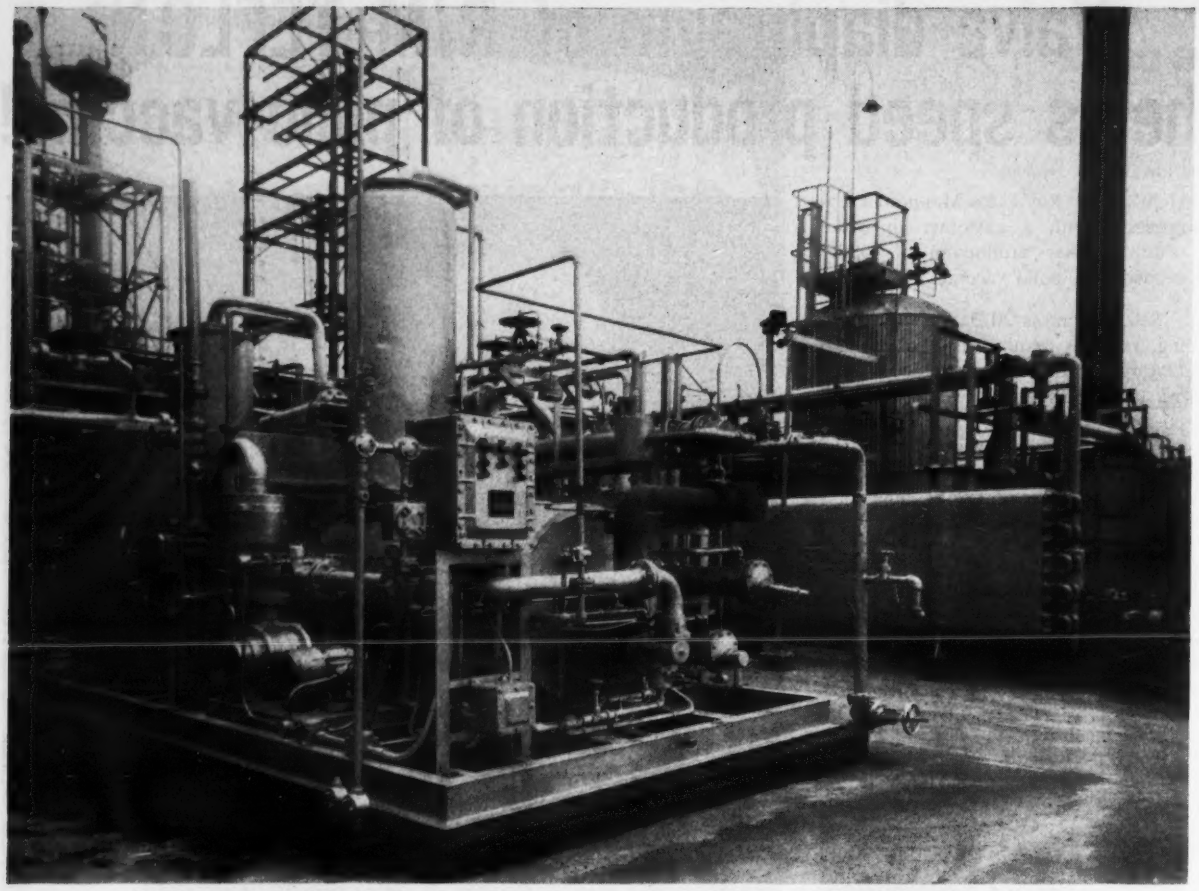

Gas Atmospheres built combination generator in operation at The Texas Company's Port Arthur, Texas refinery.

Gas Atmospheres Generator Sees Double Duty At The Texas Co. Refinery

COMBINATION NITROGEN/CO_2 PLANT ECONOMIZES PRODUCTION OF OIL ADDITIVES

HERE'S the Gas Atmospheres' combination generator that has petroleum engineers talking. Recently installed by The Texas Company at their Port Arthur, Texas refinery this highly versatile generator produces continuously high purity nitrogen and carbon dioxide at the same time . . . and, at the cost of producing either gas alone. The unit pictured is designed to produce 10,000 c.f. of nitrogen and 150 lbs. of CO_2 per hour. Gas Atmospheres plants of this type can be built to produce up to 40,000 c.f. of nitrogen and 600 lbs. of CO_2 per hour.

Highest Safety Factors

Designed for outdoor installation the unit features nozzle mix combustion for highest safety. This design permits the use of the widest possible range of fuels for burning.

Built on a common base, this compact unit was completely factory tested prior to shipment and quickly and easily installed at minimum cost.

The complete installation includes compressors and drying equipment engineered by Gas Atmospheres.

gas Atmospheres, inc
equipment for producing industrial gases
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529

Check 2919 opposite last page.

RECENT BOOKS

the material in the book has been used at the school during the past two years.

Clearly and concisely written, the book gives a good middle-of-the-road approach to all aspects of engineering thermodynamics. The problems and study aids are designed to make the reader think rather than calculate.

Although the book contains only eight photographs, it is otherwise well illustrated with charts, tables, graphs, and drawings. 6-page appendix includes conversion units, thermodynamic properties of selected materials, K-values, other useful information.

To obtain "Thermodynamics for Chemical Engineers" remit $8.50 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Check 2920 opposite last page.

Solvents

Reviewed by
L. N. DEVONSHIRE
Department of Chemistry
University of Alabama

This seventh edition, revised by Thomas H. Durrans, represents, in 244 pages, a composite of British and American views, specifications, and data concerning solvents and plasticizers of particular interest in the plastics industry. Details of manufacture are not included.

Part I, the first 72 pages, consists of chapters on solvent action, solvent power, plasticizing solvents, solvent balance, viscosity, vapor pressure and evaporation rates, inflammability, and toxicity. This introduction is an expert presentation of basic definitions, theory, and techniques of measurement, illustrating the dependence of practical application upon physical, chemical, and physiological properties.

Part II contains eight chapters devoted to specifications, figures for physical and chemical characteristics, and other pertinent information con-

To page 26

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 12.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

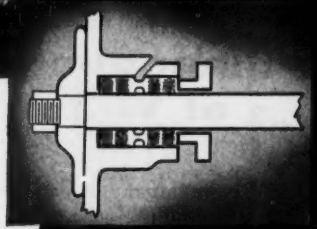
For more information on product at right, specify 2921 see information request blank opposite last page.

MORE OF THE GARLOCK 2,000

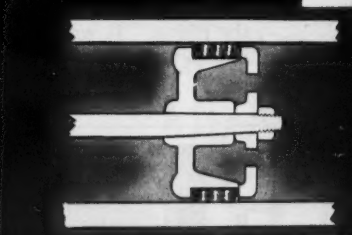
LATTICE-BRAID Packings of pure Teflon fiber for rotating shafts at high peripheral speeds . . . tough, chemically inert, yet resilient for positive sealing and cooler operation under extreme temperature and chemical exposure.

LATTICE-BRAID Asbestos Packing with Teflon impregnation, reduces friction, provides better seal with less gland pressure.

Wherever corrosion, contamination or torque is a problem on reciprocating applications or slow-turning valves CHEVRON Packing made of Teflon is recommended.



Centrifugal pumps handling hot sulfuric acid and petroleum fractions leaked badly with ordinary packing. Also, new shaft sleeve required every few days. Teflon packing reduced leakage, and after several months service both packing and shaft were still in good condition.



Teflon packing rings on duplex pump handling 50% sodium hydroxide at 270 F. showed no sign of wear after 5 months. Formerly, packing lasted average of 30 days.

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Packings Reduce Process Shutdowns

Garlock LATTICE-BRAID† Packings of Teflon reduce maintenance, lower replacement costs, reduce wear on pistons and shafts, and increase productive capacity in countless pump applications where corrosive chemicals and severe operating conditions are encountered. The unique properties of Teflon (chemically inert, heat-resistant, low coefficient of friction, etc.) make it outstanding for use in chemical or petroleum process pump packings.

LATTICE-BRAID Packings of Teflon are another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the only complete line. That's why you get *unbiased* recommendations from your Garlock representative. Call him, or write for LATTICE-BRAID Catalog AD 131.

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For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada. For information on other fluorocarbon plastic products contact United States Gasket Company, Plastics Division of Garlock.

*DuPont Company Trademark †Registered Trademarks

GARLOCK

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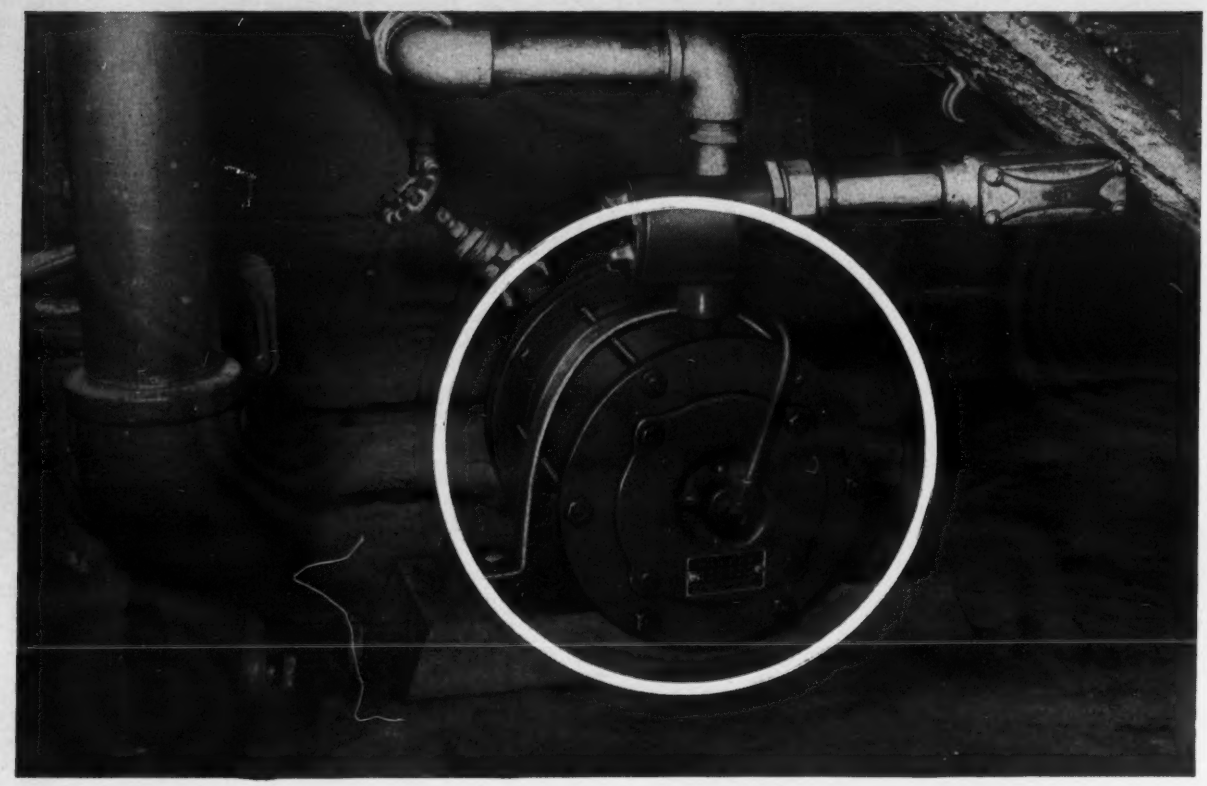

Chempump eliminates fire hazard

handling acetone and naphtha at Vi-Jon Laboratories

This *Chempump* moves a highly inflammable mixture of acetone and naphtha in the manufacture of chemical specialties and cosmetics at Vi-Jon Laboratories' St. Louis plant. The conventional pump it replaced leaked continually at the packing gland, creating a fire hazard. The leakproof *Chempump* solved this serious problem.

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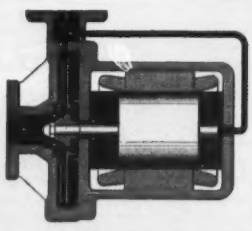
With *Chempump*, hard-to-handle fluids can't leak—in or out—because there are no seals, no stuffing box, no packing. Occasional inspection and replacement of bearings is the only care required. External lubrication is never needed—bearings are constantly lubricated by the pumped fluid itself.

Leakproof fluid handling with *Chempump* offers many other advantages well worth your investigation. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

Check 2922 opposite last page.

RECENT BOOKS

From page 24

cerning common solvents classified according to chemical composition: hydrocarbons, nitroparaffins, alcohols and their ethers, ketones, esters, glycols and their ethers, cyclohexane derivatives, chloro compounds, and furanes. Data for the plasticizing solvents are presented in Chapter IX. Particularly noteworthy is the 18-page appendix listing trade names, solubility tables, and plasticizer proportions, which precedes the 7-page comprehensive index.

This well-documented volume, having undergone extensive modernization and revision, will undoubtedly not only retain its esteem in the plastics industry, but will also attract many new readers.

To obtain "Solvents," remit $8 direct to D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 10, N. Y.

Check 2923 opposite last page.

Properties of Petroleum Reservoir Fluids

Reviewed by D. S. DAVIS
Head, Department of Pulp and Paper Technology
University of Alabama

Practicing petroleum engineers are increasingly concerned with reservoir fluids, which can be quite complex systems of liquid-gas hydrocarbons at high temperatures and pressures. For them and for students and teachers of petroleum engineering, Emil J. Burcik, of Pennsylvania State University, has generously assembled from his wide experience a wealth of exceptionally complete and informative material. Furthermore, he has tied it in thoroughly with the principles of physical chemistry.

The publishers, not to be outdone, have matched the quality of the subject matter with the very best in book

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Photo courtesy of Economics Laboratories, Inc.

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Almost more important than your original truck purchase is the service you get *after* delivery. Quality of the truck is taken for granted. What you're interested in is *keeping* the equipment on the job and keeping maintenance costs down. It's why competent local service is so important.

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Have you noticed? . . . the last six issues of CHEMICAL PROCESSING have been *different!* Lay this copy alongside an earlier issue (before July) . . . compare them. Hold the new issue in your hands . . . slip it into your brief case. It "fits" . . . invites easy reading . . . for busy chemical executives.

IT NAMED ITSELF "THE EXECUTIVE SIZE" . . .

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design. Together they've come up with one of the most satisfactory engineering texts that have crossed this desk in many years.

The seven chapters are devoted to petroleum deposits, behavior of gases and liquids, qualitative and quantitative phase behavior, characteristics of reservoir fluids, and applications of principles. Author has thoughtfully provided good problems at the end of each chapter — 84 problems in all — many of which bear answers for the benefit of those who are studying on their own. Material is well-documented, and the 190-page book fairly bristles with excellent charts, clear tables, and equations.

Burcik's text dovetails beautifully with two other fine Wiley offerings: "Chemical Process Principles" by Hougen, Watson, and Ragatz, written in a similar vein, and with "Project Engineering of Process Plant," by Rase and Barrow.

To obtain "Properties of Petroleum Reservoir Fluids," remit $7.50 direct to John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y.

Check 2925 opposite last page.

"Thought you were coming back loaded with processing ideas . . ."

Sam Spinner's Mail Box

by Sam Spinner

CASE #1

Problem: Can we do centrifuging on a completely automatic basis?

Solution: You'll find the answer in the photograph and the flow chart at the right. Note that liquor outlet and solids discharge chutes operate simultaneously — automatically.

CASE #2

Problem: A particularly hard packed solid had given a plant owner considerable trouble in plowing from his centrifugal machine. His method of plowing consisted of jogging his motor to maintain a plowing speed. This resulted in constant inrushes of power that overheated and burned out his expensive Main Drive Motor.

Solution: AT&M positive speed Unloading Drive was installed as an integral part of the Main Drive Motor. This Unloading Drive, powered by a separate 2 H.P. plowing motor, gave a constant plowing speed of 45 R.P.M. through a rugged worm and gear drive. The operator was able to devote his entire attention to the plowing. The Main Drive Motor, relieved of its plowing duty, gave no further trouble.

CASE #3

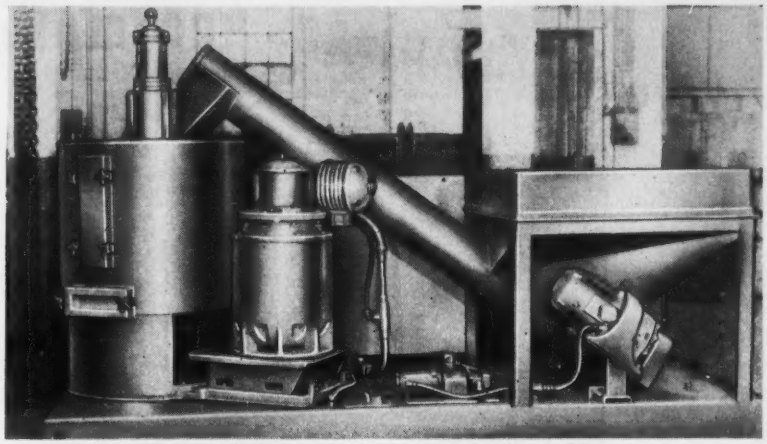
Problem: A valuable high viscosity slurry required a high speed clarifier to separate the solids from the liquor. Due to the characteristics of the slurry the conventional type baffle basket could not be used.

Solution: AT&M built a Link-Suspended Type Centrifugal that developed 2000 x gravity. The solid bowl basket with special baffles, built to distribute the load evenly, gave the proper separation.

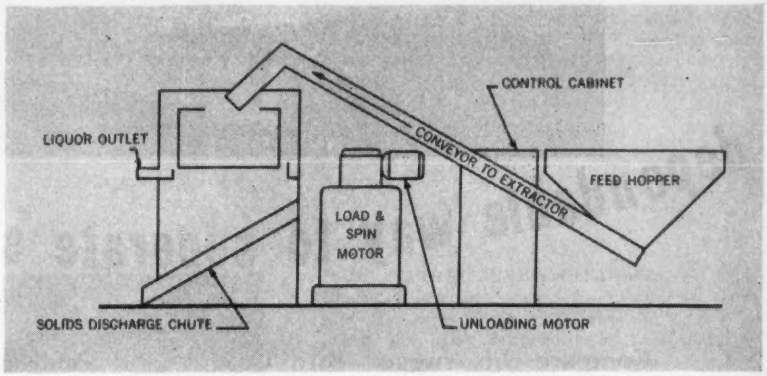
CASE #4

Problem: An application of a Suspended type centrifugal, with its convenience of plowing out through the bottom, was complicated by the lack of headroom to accommodate the conventional type Direct-Driven Machine.

Solution: A V Belt driven Suspended Centrifugal, with the motor suspended in an inverted position at one end of the frame, provided the answer to the limited headroom. An AT&M Unloading Drive mounted on this inverted motor provided a positive slow speed drive for plowing.



AT&M centrifugal for separating solids and liquids loads automatically, separates automatically, unloads automatically.



Solids Separated from liquids automatically—fast

This is another AT&M achievement in centrifuging for chemical processors.

A difficult problem of separating solids from liquids was solved by AT&M engineers. The installation is a completely electronic-controlled "Hy Par" base-bearing centrifugal. Loading and unloading is automatic. Liquid-solid separation is fast and efficient.

AT&M centrifugals are widely used in Separation, Dehydration, Coating, Filtering, Impregnation and Sedimentation processes.

New models make maximum use of time and space, with top safety. Send coupon for data.

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Please send me my free copy of the new AT&M booklet "Centrifugal Force." I am interested in the following processes:

Separation ☐ Extraction ☐ Dehydration ☐ Clarification ☐
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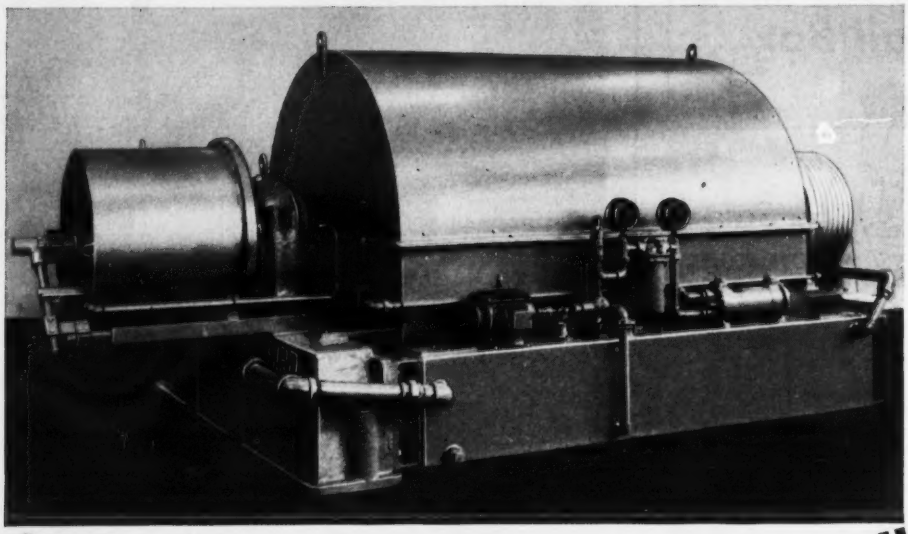
Check 2926 opposite last page.

Here is the clean, uncomplicated, constantly dependable way to separate solids from liquids



Compare this rugged Bird Continuous Solid Bowl Centrifugal Filter with any other type of filter for ease and economy of installation, operation and maintenance.

You just put it on its foundation, pipe in the feed and provide for solids and filtrate discharge. No filter media to clean or replace, no vacuum, no auxiliaries, no complex controls. It runs itself, without attention.

And what other filter can:

- filter solids that range from a half inch to a fraction of a micron
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- process hazardous materials safely and volatile materials without waste

Make it prove itself in advance. You can find out what this BIRD can do to meet your process and product requirements on your feed slurry under your operating conditions *before you invest a single penny.* The Bird Research and Development Center is equipped to provide authentic, confidential pilot-scale test findings. It's yours to use.

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Check 2927 opposite last page.

Economists have generally stated they believe 1958 will bring a leveling-off of the dynamic growth-rate that has sparked American industry since the end of World War II. But what about the chemical processing industries? Are these industries, which have suffered the largest growing pains throughout this period, going to experience the same leveling-off?

This was the big question facing chemical processing leaders when CHEMICAL PROCESSING asked them to participate in this year's LEADERS SPEAK series.

On the following eight pages you will find their answers to this question. You will read how they view the situation, what steps they are going to take, and, finally, what it all adds up to for their particular industry.

To them, 1958 will stack up like this:

HANS STAUFFER, president, Stauffer Chemical Co., feels that technology and inorganics will highlight *chemical* advances in 1958.

M. P. VENEMA, UOP's president, sees technology and geography as significant factors in a growing *petrochemical* industry.

Non-cellulosic *chemical fibers* to rise in falling textile markets — EDWARD A. O'NEAL, JR, Chemstrand's president.

Both A. B. LAYTON, Crown Zellerbach president, and EDWARD MCSWEENEY, Perkins-Goodwin vp, agree that 1958 will see a *pulp and paper* emphasis shift from production to marketing.

Petroleum now can plan for growth-rate surge expected in 1960's, says Sohio's president, C. T. FOSTER.

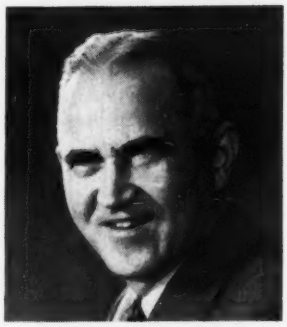
In spite of "a breathing spell," *rubber* can expect a slight rise in sales, predicts H. E. HUMPHREYS, JR., US Rubber's board chairman.

C. ROBERT FAY, *Pittsburgh Plate Glass* vp, expects diversification into associated products, namely plastics, to give *paint* industry its highest prospect in 1958.

Leaders Speak - about 1958

Dynamic technology — key to continued growth in 1958

HANS STAUFFER
President
Stauffer Chemical Company



HANS STAUFFER, president of Stauffer Chemical Company, started his career with that company in 1920, when he joined the sales department in San Francisco. He was promoted to sales manager in 1927 and became vice president and general manager in 1941. Thirteen years later, in 1954, he took over the helm of the company as president.

Mr. Stauffer makes his home in Bronxville, N. Y. The company manufactures industrial and agricultural chemicals in 50 plants in 20 states. Sales are valued at about $160 million annually.

THE conventional method of assessing chemical business prospects is to evaluate such over-all industrial criteria as gross national product, carloadings, and anticipated capital expenditures. Such an appraisal of these important barometers of our general economy certainly has merit. All of us in the chemical industry appreciate that ours is, in large part, a service industry; that chemical consumption usually parallels, and is dependent upon, the vigor of major consuming industries.

These industires, and the chemical industry as well, can and will be affected by major economic shifts in 1958. It is evident, for example, that government expenditures, particularly for defense, will be extraordinarily important in determining the vigor of our economy. Cutbacks have been proposed. But that may well be changed, dependent upon the temper of the public and the will of Congress — both of which are influenced by events and circumstances in other parts of the world. The level of general economic activity can be further affected by developments in the automotive industry, the road building program, and the number of housing starts.

Effects of Tight Money

Fiscal policies fixed in Washington will also be major business determinants. A "tight money" policy may compel curtailment of many capital expenditures, and this can be accentuated if the government decides to cut back the financing of plants for defense items. Such a policy, if adopted, would put double pressure on the funds available to private industry. And the rate of capital expenditure will inevitably shape total business activity.

Few of these developments are solidly predictable. Many stem from international circumstances which are entirely outside our control and possibly beyond anyone's anticipation; some hinge on human emotions; others on consumer tastes and preferences. In the face of this uncertainty, one thing is certain — our nation's technology will continue to make rapid and significant advances in 1958.

In recent years, as a result of the heavy investments in scientific manpower and facilities, research has yielded many new products. Progressive technology has converted many of these products, in a brief time, into commercial, profit-yielding commodities.

Past Holds Clue to Future

It's an old axiom that the present grew out of the past, and the future has its makings in the present. Accordingly, it may be worthwhile to examine certain technological developments of the recent past for a clue as to what the future will hold.

Chlorine is among the most familiar and commonplace of the basic chemicals. A scant five

To page 38

LEADERS SPEAK—ABOUT 1958

Petrochemicals in 1958:
'It's hard not to be optimistic'

M. P. VENEMA, president of Universal Oil Products Company since November 1955, has been with the company since 1935, having served as vice president from 1949 to 1952, and executive vice president from 1952 to 1955. In December 1955, he was elected to the Board of Directors. A graduate of the Illinois Institute of Technology, Mr. Venema received his BS in chemical engineering in 1932.

M. P. VENEMA
President
Universal Oil Products Company
Des Plaines, Ill.

IT is difficult for anyone associated with the petrochemical industry not to be optimistic about its short-range and long-term potentials. But specific predictions are difficult to make when an industry is so intimately linked with so many phases of American daily life. Any prediction of petrochemical sales requires prior knowledge of what will happen in such unrelated areas as automobile sales, government farm policies, and availability of residential mortgage money.

Any prediction is further complicated by the diversity of the petrochemical field. Technological developments that will increase the sale of one oil derivative may well reduce the demand for another petrochemical. Regional marketing problems and trends in plant location will also have a major affect upon sales. Transportation costs can result in over-production in one area and a good sales and profit picture in another area one thousand miles away.

If prevailing forecasts of the total US economic condition are accurate, there may be a leveling-off of the petrochemical growth that has been so marked in recent years. But it must be remembered that the industry has become so accustomed to a fantastic growth rate that what would be regarded as only a minor increase in petrochemical sales would be heralded as a major boom in steel, non-ferrous metals, lumber, construction, or any of a score of other industries. There probably will be price pressures upon some petrochemicals in some geographical areas, but the pattern should not be uniform or constant.

Petrochemical production in 1958 probably will total about 45 billion pounds, valued at approximately $5.1 billion. Petrochemicals' share of the total US chemical market should increase to 28% from the estimated 26% for 1957.

Petrochemical production can be broken down into three primary categories: inorganic, aliphatic, and aromatic chemicals. Most closely linked to general industrial trends are the inorganics, such as carbon black and ammonia. With the greatest bulk of carbon black production going into tires, sales of the chemical will be determined by the pace of automotive and replacement tire demands. Ammonia production is tied to fertilizer sales, hence it depends upon such nonchemical factors as federal acreage limitations, food exports, and the outlook for agricultural products prices.

Aliphatics, which include a large number of intermediates and solvents used in a broad spectrum of American industry, are affected by peculiar determinants of particular industries, as well as by general economic conditions. Methanol and ethylene glycol sales are closely related to automotive sales and to the severity of winter weather. Formaldehyde, an important methanol derivative, finds much of its market in the manufacture of plywood-bonding adhesives. Therefore, what happens to formaldehyde largely depends upon the demand for plywood and plywood's biggest user, residential construction.

Both aliphatics and aromatics are closely tied to plastics and synthetic rubber industries. Plastics consumption is almost certain to continue its dramatic annual increases. New uses for polyethylene packaging materials are being found almost daily, to cite only one example.

No Supply Problem

Whatever patterns are followed by individual petrochemicals, there will be no supply problem resulting from possible cut-backs in oil refining. For example, ethylene, one of the most important petrochemical intermediates, is produced from a wide variety of crude stocks, from natural gas, refinery offgas, and to some extent, from heavy oil.

Reports of overproduction must be regarded in the light of special marketing conditions. There is a strong trend toward building plants that will supply captive markets. A petrochemical manufacturer and an operator of retail stores, for example, have joined in erecting a glycol plant that will produce automotive antifreeze to be marketed by the retail chain and by the service stations of the petrochemical manufacturer's oil company parents. Farmer cooperatives have helped establish ammonia plants, with a significant portion of the output going into fertilizer for the members of the co-op.

Geography is also assuming an increasingly significant role in supply-and-demand ratios. Several big ammonia plants are being planned for the Midwest farm belt, an area where comparatively little ammonia fertilizer has been used in the past. Availability of pipeline natural gas and rising freight rates have made it more desirable to erect plants closer to the customer than to expand existing plants in the lower Mississippi Valley cotton-growing areas.

No Drastic Demand Changes

Although it is extremely difficult to predict exact sales increases for individual petrochemical derivatives, recent history and long-term trends indicate that tonnage volumes will rise in 1958. It is difficult to imagine polyethylene, butadiene,

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LEADERS SPEAK—ABOUT 1958

This year's outlook good for chemical fibers

EDWARD A. O'NEAL, JR.
President
The Chemstrand Corporation

Consumer demand for the true chemical fibers is expected to follow the constant upward trend during 1958, that it has demonstrated for the past decade, despite a relatively unpromising outlook for the over-all textile industry.

The first six months of 1958 should show textile mills operating at about the same levels which prevail today. There is some hope, but very little evidence to support it as yet, that activity in the industry may increase during the last half of 1958.

Within the structure of the textile industry, however, the fastest growing branch has been the non-cellulosic chemical fibers. Consumption of these fibers 10 years ago was something less than 100 million pounds. In 1956, the industry consumed about 400 million pounds of non-cellulosic chemical fibers, and estimates place the 1957 consumption at more than 500 million pounds.

Gains to Continue

There is every reason to believe that the gains which these fibers have shown in the past will continue in 1958.

In line with this trend, the Chemstrand Corporation has increased capacity at its Acrilan plant at Decatur, Ala., and at its nylon plant at Pensacola, Fla.

Because of their adaptability to a wide variety of end products, the true chemical fibers have assumed a position of leadership in many areas of the textile industry.

In trying to analyze the markets which will absorb these non-cellulosic fibers, we may break them down into three major areas — textile apparel, home furnishings, and industrial.

Apparel Field

In the apparel field, one particularly strong segment of the industry involves the use of textured nylon filament yarns. A number of successful processes have been developed which enable the manufacturer to modify a nylon filament yarn so that in the final garment it will have the pleasing texture and hand of a staple fiber without some of the detriments, such as pilling. Textile mills and throwsters are installing new texturizing equipment at a rapid rate. These new textured nylon yarns have put nylon back in the sweater market and have been successfully marketed as stretch socks.

Another factor of strength in the non-cellulosic field is the trend toward wash-and-wear clothing. Polyester, polyamide, and polyacrylic fibers will continue to play a very important role in this field. A true wash-and-wear garment may be made of combinations of these hydrophobic fibers. In complicated garments such as suits, the linings, pockets, padding and threads all must be of fiber with the wash-and-wear characteristics.

Home Furnishings

In the home furnishings field, the year has shown substantial growth for acrylic fibers, such as Acrilan, in the carpet industry. A combination of many qualities, such as resilience, easy cleaning, and good wearing properties have made this fiber a very significant factor in the manufacture of carpets. Demand for Acrilan and other acrylics for use in carpets is expected to increase substantially in 1958.

In the upholstery field, nylon and textured nylon yarns continued to gain popularity during 1957, and the trend is expected to continue during 1958.

Acrilan and other acrylic fibers are now substantial contributors to better quality blankets and should continue to make gains in 1958. Made into blankets, these fibers combine light weight and warmth with washability — all qualities which appeal to the buying public.

Industrial Applications

In the industrial field, the most important single item is the very substantial gain of nylon in the tire cord market. In line with this expanding field, Chemstrand has developed and is widely marketing a heavy-duty, high-strength tire cord yarn which should give even further impetus to sales.

Other industrial end products into which nylon has been going at increased rates include rope, thread, fish net, conveyor belts, air bellows, suspension systems, hoses, laundry fabrics, and coated fabrics.

In the over-all chemical fiber picture, the polyacrylics seem destined to become the leading fibers in apparel and home furnishings, with the polyamides developing in these areas and increasing their already prominent applications in the industrial field. It appears certain that 1958 will see continued growth in the chemical fiber industry.

EDWARD A. O'NEAL, JR. has been president of Chemstrand since May 15, 1956. He began his business career in 1926 when he joined the Swann Corporation of Anniston, Alabama. Swann was acquired by Monsanto Chemical Company in 1935.

Mr. O'Neal served in various positions with Monsanto and was named vice president and general manager of the Overseas Division in 1954. He was elected to Monsanto's Board of Directors and named vice president for the firm's international operations in 1955.

Chemstrand is a jointly owned associate company of Monsanto and American Viscose Corporation. A manufacturer of chemical textile fibers, its major products are Acrilan acrylic fiber and nylon. Mr. O'Neal became a member of Chemstrand's Board of Directors in April, 1955. He holds a BA degree from Davidson College, Davidson, S. C.

Mr. and Mrs. O'Neal are members of the Episcopal Church. They have four children.

LEADERS SPEAK—ABOUT 1958

The paper industry: still a bright future

BY A. B. LAYTON
President
Crown Zellerbach Corporation

ALFRED B. LAYTON was graduated from Stanford University in 1924 and joined the Zellerbach Corporation, a Crown Zellerbach predecessor company, as a laborer. In 1926 he joined the sales department and progressed to the post of resident manager of the company's Port Townsend, Washington, plant

In 1932 Layton was placed in charge of Eastern Operations for Crown Zellerbach. He was elected vice president in 1933.

After serving in a number of capacities, including director, member of the executive and management committees, and as the Corporation's chief administrative and financial officer, he was elected president in 1956.

In my opinion, the paper industry is a mighty healthy growing youngster with a bright future, who has only proven himself human by growing a bit faster than his strength.

Here are some of my reasons:

This historical development of the paper industry demonstrates that it is a growth industry. Perhaps one statistic that points this up is the fact that in 1955 the industry's production was 14 times greater than in 1900, whereas the Gross National Product (in constant dollars) was only six times greater.

The paper industry, because of its nature, must be managed and regarded from a long-range view point. Unlike some other industries, we cannot work on a year-to-year basis or adjust our basic planning to meet short-term fluctuations in the economy. Our industry requires substantial capital investment — today in the order of $100,000-per-ton of daily capacity. We only turn over our invested capital once every one to two years. We grow our raw material as a crop in cycles ranging from 25 to 80-plus years. In planning new production facilities, it takes us at least two years before a mill may be constructed and placed in operation.

Requires Judicious Growth

These circumstances place a high premium on wise and judicious corporate growth. We must do our best to time new facilities to come into production at the same time expected increases in demand will absorb them. If we err on the conservative side, we risk losing a market to a more courageous competitor who gets there first; if we err on the optimistic side, we risk operating a new facility at less than full capacity until demand catches up. Being human, it is not possible for us to always hit the nail on the head in timing completion of new facilities to coincide exactly with forecasted increased demand.

In the period between 1952 and 1956, United States consumption of paper and paperboard increased from 29,017,000 to 36,600,000 tons — an increase of 7,583,000 tons or 26.1% — an average of about 6% a year compounded.

During this five-year period, the United States industry operated at an average of 94.8% of capacity ("historic capacity", based on a six-day, 310-days-a-year operation), ranging from 89% in 1952 to 99.8% in 1956 — and these five years were the most prosperous in the industry's existence.

In 1957, when all statistics are available, the US industry operating ratio should average 89.3% of capacity on a historic basis.

Therefore, what has happened is this:

Since autumn 1956, additional productive capacity was completed so that the industry shifted from an economy of scarcity to an economy of plenty. This was particularly true in what we term "coarse papers," that is, kraft pulp, paper, and paperboard.

As a result, with supply readily available, there was no longer any need for customers to maintain as high inventories as formerly, place orders as far in advance, or in such large quantities. The tight money market

Pulp and paper trends coming of age

EDWARD MCSWEENEY began his career in the newspaper business in Boston, later was with Conte Nast Publications and Butterick Publications.

He founded Edward McSweeney Associates, management consultants, in 1933.

During World War II, McSweeney was with the WPB, the OPA, the NPA, and the Department of Defense.

He is now Vice President and Treasurer of the consulting firm of Perkins-Goodwin Company in New York.

EDWARD MCSWEENEY
Vice President and Treasurer
Perkins-Goodwin Company

For at least a decade, the pulp and paper industry has been taking giant steps in the areas of expansion, increases in per-capita consumption, and over-all impact upon our economy. During that same period there have been a number of developments that indicated the industry was on the threshold of a whole new era of growth and prosperity for those who could read the signs.

Now there is evidence that the year ahead will bring to maturity many of the trends that have been developing, and start separating the men from the boys.

For anyone who wanted to look, there have been certain clearly defined trends. Without attempting to list them in the order of their importance or to cover them in detail, here are some of the more important ones.

Obviously, the emphasis will go over from the development of new sources of raw material

exerted further pressures for liquidating inventories.

Meanwhile, all items of cost continued to increase, including such things as wage rates and salaries, transportation, chemicals, fuel, and replacement parts and equipment. Because of the competitive situation, the industry has been unable to fully pass on these cost increases to its customers. However, it is significant that despite the abundance of paper and paperboard, prices, for the most part, have remained firm and in some instances nominally increased.

The effect has been:

Usage has not fallen off from 1956, but the industry has been unable to sell all of its additional productive capacity, construction of which was started a year or two ago.

The industry has also experienced a profit squeeze due to costs increasing at a greater rate than prices, plus having to absorb increased fixed charges for the new capacity that it has been unable to sell.

In addition to coarse papers, newsprint is another product line now in plentiful supply.

$4-Billion Expansion Seen

The recent report of the United States Department of Commerce on the Pulp, Paper and Board Supply-Demand, is the most comprehensive study of the industry yet made and in substance confirms Crown Zellerbach's own projections. It is significant that this report forecasts that in 1965 the estimated United States demand for paper and board will total 43,800,000 tons, an increase of 40% over 1956 production of 31,336,000 tons. If this eventuates, it means that just eight years from now the industry will have to produce 12 million more tons than was produced in 1956. At 310 days a year, this is 40,000 tons a day, and at present construction costs of approximately $100,000-per-daily-ton of capacity, this would require an outlay of some $4-billion to supply the expected demand for products of the industry.

The Economics Research section of our Long-Range Planning Department has just compiled a comparison of total North American capacity with estimated demand in 1957, 1958, and 1959 compared to 1956, based on this Department of Commerce report and an analysis of materials from Canadian source.

Percent of Estimated Demand to Total North American Capacity

(Based on "Historic Capacity")

	1956	1957	1958	1959
Over-all North American Industry	99.4	90.9	93.9	94.5
Total Paper	105.8	98.5	96.2	95.2
Total Board	93.1	83.2	91.5	93.8
Newsprint	104.3	97.9	91.7	90.0
Printing and Fine Papers	106.9	97.3	94.0	92.2
(Coated magazine paper, included in this category, from our analysis will be better than figures for this category as a whole)				
Coarse and Special Industrial Papers	109.8	102.0	106.2	109.2
Container Board	99.1	87.6	88.9	92.5
Tissue and Sanitary Papers	99.0	97.1	99.8	97.8

These figures are expressed in terms of percent operating ratios based on "historic capacity" (see table).

In this connection I would like to call attention to two recent reports — one published by the research staff of Goodbody and Company and the other by Dr. Louis T. Stevenson of Tucker, Anthony and Day, containing, among other things, their opinions on the relationship of operating ratios to profits. It is interesting to note that both reports agree that the industry can operate profitably with lower utilization of capacity than has been the case during the past several years.

The foregoing observations explain my belief that our industry today is only suffering the temporary ailment of growing pains rather than having contracted a serious permanent disease. True, for 1957 and probably for the next year or so, the industry is not likely to make the same kind of spectacular annual profit increases that it has made over the past five years. The longer range outlook is certainly a bright and optimistic one, particularly for those aggressive companies who take advantage of the particular opportunities afforded in the markets they serve, and who have flexibility in their production facilities to shift and be selective in the grades they produce and offer for sale.

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and new capacity to "marketing" in all its newest and most modern aspects.

This new concept of marketing embraces an ever-increasing emphasis upon the "creative function" in the areas of product research and development, integration into primary markets, and in many instances a complete reappraisal of all the present channels of distribution. The cost of moving bulk items will become a more important factor in the determination of profit potentials and marketing strategy, and will lead toward more decentralization and regional production.

Another trend that has been making rapid headway and that will be accelerated is the integration into end product. Many smaller paper mills have either learned to convert their base material into products or are entering into "joint ventures" where the financial resources and management skills are merged on a non-merger basis.

Producers Buying Converters

The larger producers have been buying up converters of their products, usually on the basis of ready accessibility to important markets. This trend will be of ever-increasing importance to both communication and functional papers in the period just ahead.

From the standpoint of raw materials, the major impact will undoubtedly be a more general acknowledgement that large segments of the pulp and paper industry are moving toward a closer relationship with the chemical processing field.

The manufacturing of chemical pulp logically fits into the category of a chemical process, but this trend has gone much further than the preparation of pulp, and will unquestionably have an ever-increasing impact on the pulp and paper industry.

The major units in the pulp and paper industry are deeply involved in mineral rights, complete utilization of all of the trees for new products other than pulp and paper, and are now stepping-up their research and development expenditures as the only possible solution to the problem of maintaining the high level of return that they have been generating on invested capital.

The dark horse in the year-ahead sweepstakes could be a step-up in foreign production, but that is a trend that should be a lot clearer a year from now.

LEADERS SPEAK—ABOUT 1958

Petroleum industry's growth rate will level out this year . . .

. . . but great surge expected in 'sixties'

C. T. FOSTER
President
The Standard Oil Company (Ohio)

A native Clevelander, **CLYDE T. FOSTER** is a director and executive committee member of the American Petroleum Institute, and a member of the National Petroleum Council. President of The Standard Oil Company (Ohio) since 1949, Mr. Foster has many other activities and interests, such as director of The National City Bank of Cleveland.

Trained as a lawyer, Mr. Foster has been associated with, and active in, the petroleum industry since 1929. During much of this period, he has been concerned with marketing aspects of the industry.

THE factors or trends in the business picture which are likely to have the greatest effect on the petroleum industry in 1958 are with us today, continually emerging from the near-term and long-term past. Barring a national emergency, economic, political, and social forces already in motion during 1957 will have set the stage for the stream of events yet to come. The close relationship between the vigor of the petroleum industry and the economic well-being of the country as a whole has its basis in the fact that petroleum plays so vital a role in practically every major field of activity in our American way of life. Thus, the magnitude and direction of movement in petroleum's progress for the coming year will depend on the net result of a combination of rises and declines in the important areas affecting it. What are some of these important areas?

The one immediately associated with petroleum's most important product, gasoline, is the automobile. Forecasts of 1958 retail sales of automobiles approximate six million cars, which would make it the third best year in history, exceeded only in 1950 and 1955, and topping 1957 by a little. Increased registrations of cars can be expected to continue despite the relatively constant production of new cars, because scrapping of cars has been at a slower rate, thereby creating a net gain. Since consumption per car is expected to be about what it was in 1957, gasoline demand should rise in line with automobile registrations. Various estimates have set domestic gasoline consumption for 1958 at 2.5 to 3.0% above 1957.

Other areas of activity likely to affect the demand for petroleum products also seem to be characterized by a leveling of the rate of growth.

Although our population is continuing to grow, the formation of families is at a low point, reflecting the birth rate of the 1930's. This has had a direct bearing on the downturn in housing starts recently. However, because there may be an easing in mortgage money resulting from reduced business demands for new plants and equipment, the F. W. Dodge Corporation forecasts a slight improvement in housing starts during 1958 over 1957. The net impact on petroleum demand is not apt to be significant.

One of the important gains in petroleum in recent years has been the result of conversion by railroads from coal to diesel fuel. However, the conversion program is essentially complete and will continue the leveling trend in this area of growth during 1958.

Airline travel is increasing at a robust rate of 17% per year. Although both the airlines and the petroleum industry face a problem in the conversion from propeller to jet types, this is not expected to be an important factor during 1958. Demand for aviation fuels should increase in line with the growing passenger and freight traffic.

Finally, an appraisal of factors bearing on petroleum demand should include the general direction indicated by the Federal Reserve Board Index of Production, Gross National Product, Disposable Income, and Federal spending — particularly military. These measures seem to indicate the continuation of the generally high levels attained in 1957. The recent downward trend in military expenditures may be reversed by current events. However, the net result seems to be characterized by a reduced rate of growth in the immediate future.

An evaluation of all these factors, along with others of varying importance, leads to a conclusion that the domestic demand for petroleum products in 1958 will probably exceed 1957 by 2 to 3%. This compares with a post-World-War-II growth annually of 6%. Prior to the war, however, the annual rate of growth had been somewhat lower and in the range predicted for 1958, thus this is not a completely new experience. During 1957, the Suez crisis resulted in a substantial increase in exports. This factor is not expected in the 1958 picture. Therefore, the 1958 total demand for American petroleum products, both domestic and export, will exceed 1957 even less than the estimated increase in domestic requirements of 2 to 3%.

This change in the rate of growth will undoubtedly pose some special problems, such as heavy product inventories, price weakness, high costs, excess capacity, crude supply and productivity. All of these will take on added significance in the effort to earn a reasonable profit in a highly competitive industry.

But the challenge will be met to the ultimate benefit of our industry's customers. During this period of time when the rate of growth will be reduced, the industry can lay plans for the great surge of growth expected in the 1960's.

Procurement of the capital funds needed in connection with building capacity for the future will continue to be a pressing consideration of the petroleum industry during 1958 and the years beyond.

Rubber industry sales to edge up in '58

H. E. HUMPHREYS, JR.
Chairman of the Board
United States Rubber Co.

WITH the nation's economy headed for what appears to be "the pause that refreshes," rubber industry sales are expected to increase slightly to total about $5.95 billion in 1958. This compares with an estimated $5.8 billion in 1957. The industry will use approximately 1,525,000 long tons of rubber in 1958, about 64.5% of it synthetic. The 1957 estimated total was 1,475,000 tons, of which 63.3% was synthetic.

The industry will spend less on new plants and equipment in 1958: $198 million as against $208 million last year. Expenditures for research and development, however, will be up by about 7%. This year they are expected to total about $88 million compared with approximately $82 million in 1957.

The drop in capital expenditures in the rubber industry follows the downturn forecast in plant and equipment outlay in 1958 for American industry as a whole. However, the increase predicted for research activities has significance for the years beyond 1958, since investment in research stimulates capital goods spending over the long pull. Experience has shown that during periods of shrinking capital expenditures, consumers change the pattern of their spending in favor of non-durable goods and services. This could be a plus factor in the outlook for the rubber industry in 1958.

The rubber industry will be influenced strongly by trends in the auto industry. Tire and tire products will use about 943,000 long tons of new rubber in 1958. This compares with approximately 921,000 long tons consumed last year. Total passenger car, truck, and bus tire sales will come to about 105 million units, a modest rise over the estimated total of 104 million casings for 1957.

Replacement sales of passenger car tires are expected to set a new record. The 1958 estimate of approximately 58 million units will be 1.5 million tires more than the 1957 figure. These estimates reflect the net addition of 2 million more cars on the road than during 1957, and a forecast for new car sales of 6.1 million in 1958.

Chemicals and plastics production by the rubber industry will also be influenced strongly by these auto industry trends. For example, the average 1958 car will use about 15.5 pounds of assorted plastics, many produced as raw materials or used in the manufacture of automotive products by the rubber industry. In addition, about 3.5 billion pounds of chemicals, including rayon and nylon, are consumed by the rubber industry in the manufacture of tires. Many of these are manufactured within the industry.

Plastics in 1958 Car

Compound	lb/car
Polyvinyl chloride	3.5
Polyesters	2.8
Phenolics	2.2
Polyvinyl butyral	2.3
Acrylics	1.6
Acetate butyrate	1.6
Non-tire nylon and others	1.5
Total	15.5

A typical breakdown on the plastic distribution on an average 1958 car is shown in table.

Trends in the auto industry which will augment the use of rubber in 1958 are the growing importance of foam rubber in automotive construction and the introduction of air springs. About 80% of the cars made in 1958 will offer air springs as optional equipment.

However, if the consumption of rubber by the automotive industry is increasing each year, the use of non-automotive rubber is growing at a still faster rate. Thus, the present 62-38 ratio of rubber use, in favor of the automotive industry, gets a little closer to parity each year, while total consumption continues to rise. This is in part due to the accelerated development of new products, which are enjoying dynamic growth. U.S. Rubber's Sealdtank, and Sealdbin shipping containers and Shor-Kwik dunnage for railroad cars are examples of this. Production of newer plastics is expanding. These include such products as Kralastic, a rubber-plastic blend made by U.S. Rubber, which is used for piping, lawnmower parts, television antennas, luggage, and many other products.

It is anticipated that the industrial rubber products part of the rubber industry will suffer a slight recession in 1958. This will result from a lower plant and equipment expenditure by industry in general and reduced activity in the steel industry.

H. E. HUMPHREYS, JR., chairman and chief executive officer of United States Rubber Company, was born in Philadelphia, October 24, 1900. He became president and chairman of the executive committee January 1, 1949, and chairman of the board September 1, 1951. On October 9, 1957, he resigned as president, continuing as chairman of the board of directors, chairman of executive committee, and chief executive officer.

His business career began at the age of 17 as a clerk in the offices of the Pennsylvania Railroad. He continued his education by attending evening classes in Wharton School of Finance at the University of Pennsylvania. In 1924, he joined Price, Waterhouse and Company as an auditor, where he remained until 1927. After spending the next 11 years with Christiana Securities Company, Wilmington, Del., he was elected a vice president, director, and member of the executive committee of U. S. Rubber in 1938.

Diversification to brighten paint industry's outlook

C. ROBERT FAY, Vice President
Paint and Brush Division
Pittsburgh Plate Glass Company

C. ROBERT FAY, associated with Pittsburgh Plate Glass since 1944, was elected to his present position as a board member and Paint and Brush Division vice president in 1956. Previously he was controller for the company.

Prominent in corporate, financial and accounting fields, Mr. Fay has served as president and board chairman of Controllers Institute of America and in several capacities as consultant on financial matters for the Federal government.

Measured in terms of accomplishment, the last ten years have been the most significant in the history of the paint and varnish industry. We are all familiar with its transition from relatively simple manufacturing operations into complex chemical processing. This continuing change, the result of intensified research and technical developments, has meant steady progress and expanding markets for the paint and varnish industry. It will bring still further progress in 1958 and the years ahead.

One of the major accomplishments of the expanding research program is that today's paints and finishes — from house paints to special industrial coatings — are the best ever made. In the home field, improved rubberized paints can be put on with a roller or a brush, will dry fast and will resist marring. The industry now has both enamel and lacquer automotive finishes which require only cold water to restore their original luster. There are new appliance finishes which have remarkable application and gloss retention characteristics.

For the paint manufacturer, however, the research story does not have quite the same happy theme that it does for consumers. Because the new paints and finishes are better and less of them go a longer way, actual production, although moving ahead constantly, has not quite matched the records set in other markets.

Thus, in looking to expanded markets in the future, the paint industry must depend upon two factors. First is an expanding economy in which more units of more products are turned out. The second factor is further diversification in which paint research, production facilities, and raw materials can be employed to create new and marketable products. It is in this field that the industry is likely to make its most significant advances in 1958.

To see what lies ahead, let us briefly examine these factors. First is the general economy. According to most economists and financial analysts, our current economy is now moving slowly along a high plateau. Informed opinion is that this sideway movement will continue well into 1958 with no significant overall change. All this adds up to the probability that 1958 will about equal 1957, with some industries showing slight declines and others slight gains.

As we look at these expected shifts we see that those industries which comprise the largest markets for paints and coatings are among those which expect to move forward in a modest way. These include the construction, automotive and appliance industries.

Construction Up

A brief analysis of the construction industry for 1958 could be summed up in the term "not extremely vigorous, but certainly not extremely lazy." Although no appreciable changes are anticipated in the general economic picture, it is likely that the construction industry will establish another record, with total expenditures for all types of construction reaching close to 49 billion dollars in 1958, an increase of about 5% above the estimated $47 billion for 1957.

The largest single construction component, and perhaps the most important segment to the paint industry, is privately financed residential construction which has lost ground in two successive years. Starts in 1957 are estimated at 975,000 units, off about 12% from 1956. However, it seems that the worst of the housing slump is behind us, and a reversal of the down-trend should be anticipated for 1958.

An increase in residential construction not only brings more demand for home paints, but also carries with it the probability of an increase in furniture, appliances and other household items. And the great majority of these require some type of paint or finish.

In addition to new construction, maintenance or improvement of structures is another important paint market. For years this market has been relatively stable. However, with the advent a few years ago of "custom-mixed" colors in seemingly endless shades, there is a growing trend for more frequent interior painting on a purely decorative basis. This trend is, of course, being nurtured by progressive paint manufacturers, and aggressive merchandising could create an appreciable increase in consumer demand for the paint.

Activity in the automotive industry, after introduction of the 1958 models, indicates another good year. According to figures, total car production for 1957 should be somewhere near six million, about two million off the record 1955 production. The industry pegs 1958 production anywhere from 5.8 to 6.2 million.

New Finishes for Automobiles

Thus the paint industry should, in 1958, enjoy approximately the same market for its automotive finishes as it did in 1957, on a gallonage basis. During 1958 it is expected that there will be an increasing use of the special higher-price, longer-lasting, easier-cleaned finishes. The latter are more costly, requiring more expensive raw materials and more labor to make. This cost problem could become even more acute if the rise in raw materials and labor costs continue into 1958 without an adjustment in prices.

Both paint manufacturers and automotive customers have been interested in development of water emulsion coatings. Work on these was underway last year and will be accelerated in 1958.

There seems to be, at this time, a note of optimism in the appliance industry, another important paint market. Some industry spokesmen indicate that 1958 volume will probably exceed that of 1957. This will, of course, benefit the paint industry since the latter has been particu-

larly active in developing new appliance finishes and, in 1957, introduced some outstanding products.

Introduce Duracron

For example, last year we introduced a completely different line of enamels made from a unique new family of thermosetting acrylic resins. These enamels, known as Duracron, have marked improvement in color- and gloss-retention plus a remarkable resistance to chemicals, detergents, grease, and other substances, and are expected to enjoy a growing market.

As mentioned before, paint and varnish manufacturers can look to further product diversification for new and expanded markets. In their constant search for better coatings, research scientists work with a wide range of resins and chemicals. From these they develop new and different resins and other materials, many of which, it has been found, can be used to make products other than coatings.

One such development was creation of a highly versatile line of polyester resins which can be used as a reinforcing agent with fiber-glass and other materials. Other developments include foamed products, petrochemicals, and vinyl coatings. Some paint companies, through their work with resins, are also becoming important suppliers of raw materials to the chemical and other industries.

Competitive, Aggressive Spirit

It is from such derivatives or associated products that the future of the paint industry, at this moment, looks the brightest. But even in this area, there will be stiff competition because the new laboratory-developed products will undoubtedly replace present products. However, the paint industry has demonstrated an aggressive merchandising spirit, and this, combined with improved production facilities, accelerated research, and particularly, a growing list of new products, will insure that the paint industry will keep moving ahead. ■

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Lapp
CHEMICAL
PORCELAIN

Check 2928 opposite last page.

Stauffer

From page 29

years ago, when our national chlorine capacity was rated at 2.2 million tons, the prevalent belief was that we had a surfeit of capacity. Many forecasters of future chlorine markets then based their opinions on an analysis of cold business statistics, with little regard for the dynamic character of our chemical technology. Statistics alone would certainly have dictated that no more chlorine plants be put in place.

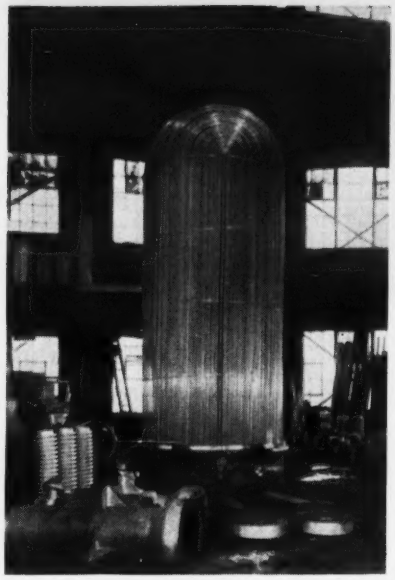
Today our national chlorine capacity is estimated at 4 million tons. It was not primarily the conventional uses of chlorine that accounted for the vast growth in needs; rather, it was newer outlets, created by new technology. I need mention only a few — the demand for many of the newer, pure metals such as titanium, zirconium, columbium and hafnium, with a consequent requirement for the basic chlorides on which their recovery from their ores is based; unique agricultural chemicals, both organic and inorganic; new chlorinated solvents; and high-energy fuels, such as those based on boron trichloride.

Chemical projects often are most profitable when they are put up in *anticipation* of needs. Such needs cannot be anticipated merely by totaling up today's statistics. They serve as guide posts, to be sure, but experience must be a potent factor in reaching such important decisions. Consider, for example, how thoroughly illogical it seemed to expand ammonia facilities just a few years ago. Yet those who put plants in place have little cause for regret. Progress in soil-injection techniques alone has provided a rewarding market. It is not unlikely that further expansion of ammonia capacity will be required in a few years.

Phosphates provide another example. The major market growth in recent years has resulted from their use as builders in detergent formulations. Prior thereto the growth pattern in phosphates had been quite steady but unspectacular. Detergent developments shifted the growth

Again-ADSCO *mammoth heat*

CHEMICAL PROCESSING



▲ GRINDING DOWN ONE OF THE WELDS made in the vapor condenser shell of Revere Herculoy. Completed unit measured 90" x 26' with a total weight of 100,000 lbs. Units were fabricated by ADSCO DIVISION, YUBA CONSOLIDATED INDUSTRIES, INC., Buffalo, N. Y.

◀ TUBE BUNDLE of 2,150 Revere Copper Tubes, each ¾" in diameter, rolled into 4,300 Tube Sheet holes, with a total weight of 26 tons and producing a surface of 14,000 sq. ft. To prevent damage during shipment wax was poured around the unsupported rounded ends of the tube bundle, which, when hardened, held the ends firmly in place. After the exchanger was placed into position the wax was blown out with steam.

exchangers contain REVERE METALS

105,000 lbs. of Revere Copper Tube and 50,000 lbs. of Revere Herculoy Plates are used in two 50-ton units fabricated for National Aniline Division, Allied Chemical & Dye Corp., by Adsco Division, Yuba Consolidated Industries, Inc.

These two units are duplicates of the two constructed for National Aniline Division, Allied Chemical & Dye Corp. in 1953.

In addition to their huge size and weight it is interesting to note that the tube bundle was constructed of copper tube because of its high thermal conductivity and corrosive-resisting characteristics, and the shell made of Herculoy because of the accuracy and speed with which it can be welded, its great strength and corrosion-resistant features.

Herculoy is Revere's silicon bronze with the tensile strength of mild steel and corrosion-resistant qualities of copper, and is a natural for shells such as these. Its characteristics also make it the economical answer for tube sheets and plates.

It is jobs such as this that have given Revere the background of experience that can prove valuable in the solution of your particular metals problem. And is still another example of Revere's Technical Advisory Service helping to select the right metal, in the right form, to do the best possible job with the greatest economy . . . whether it be copper, brass, aluminum, or any one of their alloys.

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Check 2929 opposite last page.

curve toward the perpendicular. Now, of course, the curve is leveling off to what we might classify as "normal," but experience suggests that the present curve is not truly "normal."

Normalcy for the chemical industry is seldom the calm, gentle upward inching of a production curve; rather it is one highlighted by significant "bulges." What will cause the next bulge in phosphates cannot be pinpointed with certainty, but phosphorous-boron complexes provide one interesting potential.

Bright Outlook for Organics, Inorganics

In recent years much attention has been focused on organic chemicals and on the research conducted in those areas. This is quite natural. There is no denying the remarkable achievements which have been realized in, for example, plastics and pharmaceuticals. Polyethylene has, in a little more than a decade, become a 600-million-pound-per-annum industry, which today yields a sales volume of 250 million dollars. A similar and equally spectacular growth has occurred in pharmaceuticals.

In some respects, however, the advances in organic chemicals have unduly overshadowed the progress that has been made in inorganics. That progress, too, has been substantial, and is now moving forward at a rapid pace. It is in the field of inorganics that I anticipate some of the noteworthy gains will be made next year.

We could, if space permitted, scan the horizons in other areas of our complex industry. We could envision a multitude of new opportunities for fluorine. Or bromine. Or rare earths. We could examine the trends toward disposal packaging, plastics in home construction, temperature-resistant metals for aircraft and missiles, corrosion-resistant alloys for processing equipment. Or we could scan the more distant horizons and strive to evaluate the significance that the no-moving-parts refrigerator will have to the chemical industry (based on its use of bismuth telluride); the free-piston en-

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ABBREVIATED TABLE OF CHEMICAL RESISTANCE

ACIDS		BASES		MISCELLANEOUS			
Acetic 50%	S	Ammonium Hydroxide 28%	S	Ethyl Alcohol	S	Carbon Tetrachloride	S
Chromic 25%	S	Sodium Hydroxide 50%	S	Methyl Ethyl Ketone	U	Plating Solutions	S
Hydrochloric 38%	S	HALOGENS		Gasoline	S	Photographic Solutions	S
Hydrofluoric 50%	L	Sodium Chloride Sat.	S	Mineral Oil	S	KEY: S—Satisfactory	
Nitric 20%	S	Ferric Chloride	S	Animal Oil	S	L—Limited to certain applications	
Sulphuric 50%	S	Sodium Hypochlorite 5%	S	Vegetable Oil	S	U—Unsuitable	
Sulphuric 98%	S			Phenol 10%	S		
				Chlorine 5%	L		
				Alum	S		

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Stauffer

From preceding page

gine; the use of unique metallic salts in the instant sterilization of food; the import of free radicals, ions, and photons in space propulsion.

Few of these remarkable developments will come to fruition next year. But we can be confident that research will continue to advance man's knowledge of his world and its parts, and that the chemical industry will be an active participant and a direct beneficiary. Our technology is dynamic — the key to the future and its wonders. ■

Venema

From page 30

or styrene production curves suddenly flattening out after registering increases of more than 40% annually, as they have in recent years. Even methanol consumption has increased at a 15% annual rate.

Tremendous Overseas Potential

In some lines, it is true, the increase won't be spectacular. Synthetic detergents now have about 75% of the former soap market in the US, and it is not likely that they will increase this percentage significantly. However, the detergent-soap ratio is almost exactly reversed abroad, and a tremendous potential exists for exported detergents or those produced near US-owned overseas refineries.

Existing synthetic rubber compounds have probably absorbed about as much of the natural rubber market in the US as can be expected, although a "synthetic" rubber almost identical to natural rubber has been produced in small quantities. But detergent and rubber production both can be strongly influenced by process improvements and by new formulations.

New detergents will continue to be developed, but will succeed older detergents instead of soap. New synthetic

To page 47

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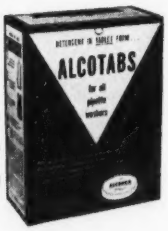

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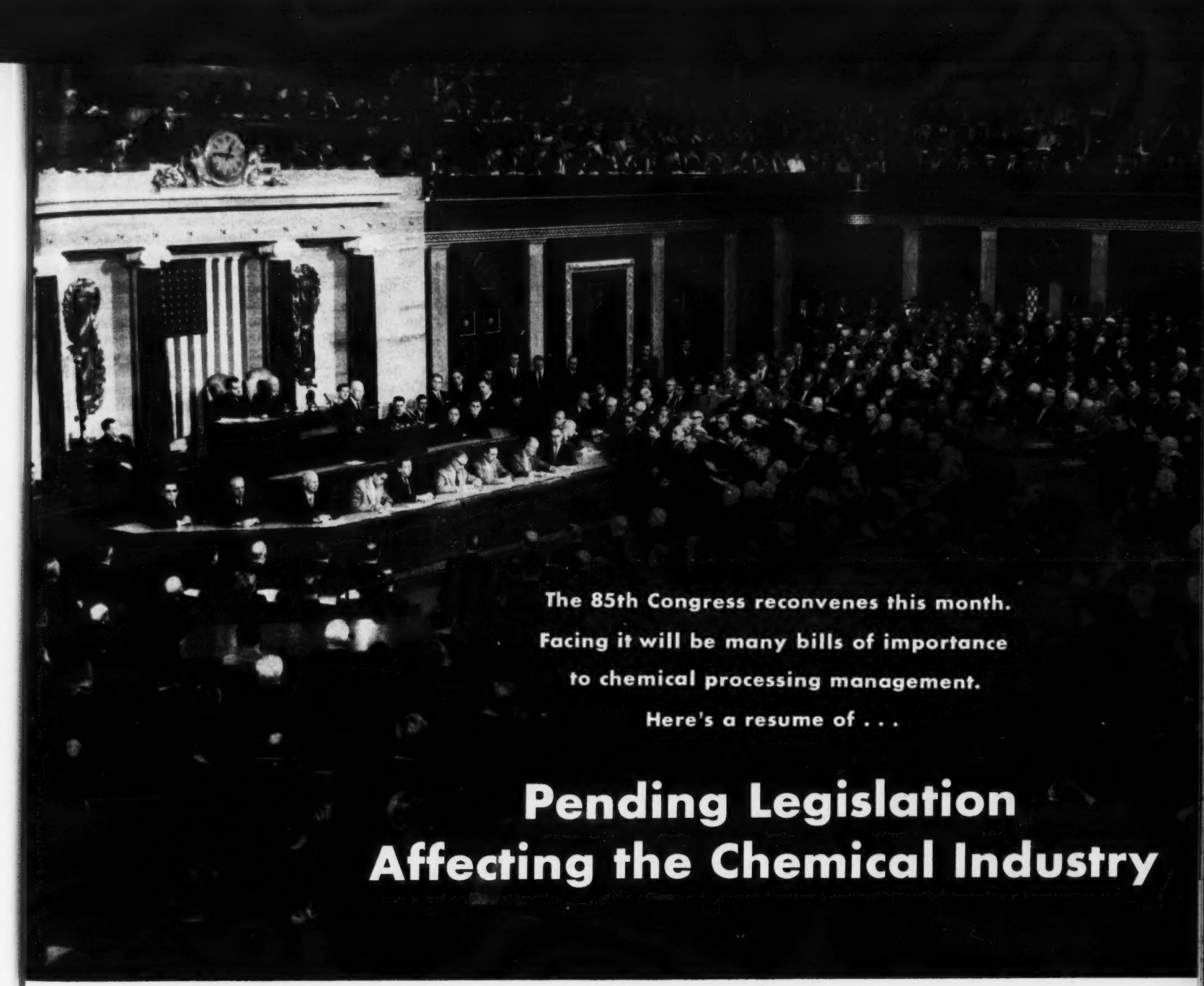

The 85th Congress reconvenes this month. Facing it will be many bills of importance to chemical processing management. Here's a resume of . . .

Pending Legislation Affecting the Chemical Industry

THIS MONTH, lawmakers return to Washington for what promises to be a lively second session of the 85th Congress. New legislative issues as well as an accumulation of unfinished business from the first session face Congressmen in an election year. A number of the pending bills up for consideration affect the industy, and should be of high interest to chemical processing management.

Significant legislation falls into four major categories: *foreign trade and tariff, antitrust, taxes,* and *food additives.* There are other issues pending which also bear watching, and these will be noted later in this article.

Foreign Trade and Tariff

US foreign trade policy is in for a stormy airing during the upcoming session, with several key issues already on the agenda, and opposing forces lined up to fight them out. One major issue confronting legislators is that of periodic renewal of the Reciprocal Trade Agreements Act due to expire on June 30, 1958. The 23-year-old act, which gives the President the power to negotiate and administer tariff-cutting agreements, faces a battle for survival as protectionists, whose numbers are increasing, seek to terminate the program entirely and re-establish tariff rate-making as a Congressional activity.

Tied in with this issue is possible Congressional consideration of US membership in the proposed Organization for Trade Cooperation of the GATT (General Agreement for Tariff and Trade). Aim of OTC is to foster tariff-lowering agreements among its member nations. A

Presidential recommendation that Congress give approval for the US to join this organization has been passed over several times, most recently during the first session of the current Congress, further reflecting the prevailing trend against continuing reduction in tariffs. There are reliable Washington reports to the effect that the Administration may not renew its request for OTC authorization for fear opposition to this bill might jeopardize extension of the Reciprocal Trade Agreements Act.

To provide the House Ways and Means Committee with background information regarding extension of this act, a subcommittee headed by Representative Hale Boggs (D., La.) is conducting roundtable discussions among economists, foreign trade specialists, and businessmen on all aspects of trade and tariff. The subcommittee has published a compendium of papers on foreign trade policy, which includes views of the

Representative Hale Boggs (D., La.) heads subcommittee conducting discussions on Reciprocal Trade Agreements Act

Manufacturing Chemists' Association on the tariff issue as it affects the industry in its relation to the entire US economy.

It is anticipated that the MCA will continue to strongly advocate selective tariff protection, as opposed to changing tariff rates on an "across-the-board" basis. MCA's statement in the compendium points out that product-by-product tariff changes, unlike uniform or across-the-board reductions in rates, can take into account such factors as whether a product is simple or complex to make. As distinguished from basic raw materials, the highly complicated, finished chemical product requires much labor, which adds to the final product cost. US labor costs are considerably higher than foreign labor costs. To keep the US producer in business, tariffs are necessary to offset this difference.

One foreign trade measure did get as far as passage by one house in the last Congressional session. After hearings were held by the House Ways and Means Committee, H. R. 6006, a bill to amend the Federal Anti-dumping Act of 1921, was passed by the House of Representatives just before Congress adjourned. ("Dumping" is the export of goods into this country at a price less than that prevailing in the country of origin.)

Richard F. Hansen of Allied Chemical, testifying on behalf of the MCA and the Synthetic Organic Chemical Manufacturers Association, told the Ways and Means Committee that "there is an increasing temptation for the rest of the world to look upon the huge United States market as a convenient place to dispose of surplus production." Mr. Hansen recommended enactment of the bill which would provide for "greater certainty, speed, and efficiency of enforcement." Included with his testimony were recommendations for a number of amendments. One of these suggestions, to require public notice of anti-dumping investigations and the subsequent results, was adopted as an amendment when the House passed the bill. The bill is currently scheduled for debate in the Senate.

Other possible legislation is a customs reform bill to modernize the current tariff rate schedule which appears in the Tariff Act of 1930.

With the widening gap between the free-trade views of the Administration and the protectionist sentiment in the Congress, the US foreign trade policy will probably undergo considerable scrutiny and possibly a considerable revision.[1]

[1] See Tariffs — Pro & Con, CHEMICAL PROCESSING, Aug. 1957, p 30; Tariff Comments — Seven Chemical Company Executives, CHEMICAL PROCESSING, Sept. 1957, p 26; and Tariffs and the Coal-tar Industry, CHEMICAL PROCESSING, Oct. 1957, p 31.

Antitrust

Antitrust investigations and proposed legislation loomed large during the first session. Under the aegis of Senator Estes Kefauver (D., Tenn.) several bills aimed at bigness in business were moved along to various stages in committees.

Active was S. 11, the Kefauver-Patman bill.[2] Of vital interest to the chemical industry, the measure has as its purpose, the amending of the existing Robinson-Patman Act. This

Senator Estes Kefauver (D., Tenn.), chairman of Antitrust and Monopoly Subcommittee, and co-sponsor of bill to amend Robinson-Patman Act

bill, which would affect both large and small business, proposes to amend the "good faith" provision of the original act. Currently, a seller charged with selling at "discriminatory prices," and thereby injuring competition, can defend his price discrimination on the basis that he was meeting a competitor's lower price and acted with reliable knowledge of the other offer. In other words, he acted in "good faith."

The Kefauver-Patman bill seeks to change that by allowing such reductions in price only when the seller's discrimination in "good faith" does not have the effect of injuring competition.

After hearings before the Antitrust and Monopoly Subcommittee, of which Senator Kefauver is chairman, the bill was moved along to the full Senate Judiciary Committee without subcommittee approval or disapproval. Extensive discussions took place in the full committee. Despite Mr. Kefauver's persistent efforts, the bill is still pending in the Senate Judiciary Committee without having gone to a vote. With the hope of inducing some action, a special subcommittee was designated to work out an amendment to S. 11 which would make the bill more acceptable to industry, but this effort was unsuccessful.

While Mr. Kefauver is confident of sufficient votes to bring his bill to the Senate floor early in the upcoming session, the opposition led by Senator Everett Dirksen (R., Ill.) is expected to continue its efforts to forestall even a committee vote.

H. R. 11, S. 11's companion bill in the House of Representatives, was left pending before the House Judiciary Committee which held no hearings at all on it.

Another activity of the Senate Antitrust and Monopoly Subcommittee reflecting the trend toward investigation of big business was the preparation of a report on "concentration in industry." This was to ascertain to what extent a limited number of companies control a high percentage of the production in their respective industries. The 756-page document presents the facts on the status of concentration in about 450 industry categories and about 1000 manufactured commodities.

The report draws no conclusions and makes no interpretations. However, it is expected to provide background for further antitrust investigations. Probably it is seeing duty at the "administered prices" hearings also being held by Senator Kefauver. According to Mr. Kefauver, the purpose of the hearings is investigation of pricing practices in industries characterized by a few dominant firms which may be manipulating prices because of their position, without regard to competitive or other market forces.

So far, representatives of the steel industry, economists, and company executives have testified. Other groups also appeared during autumn of 1957.

On the other side of Capitol

[2] See CHEMICAL PROCESSING, June 1957, p 11; and July 1957, p. 24.

Hill, the House Judiciary Committee approved H. R. 7698, a premerger notification bill which requires 60 days advance notice to the Justice Department, and to either the Federal Trade Commission or other regulatory agency, of any merger which would result in a corporation having a book value of $10 million or more. In reporting the bill, the committee provided exemptions for a number of transactions such as the acquisition of any foreign corporation, unless the corporation was doing business in the US or its possessions.

Major objections to the bill as it now stands are that it is not too clear which mergers would be allowed, and that the requisite time of advance notice leaves an opportunity for the intended merger information to leak to the wrong peopie.

At the present time the measure awaits clearance by the House Rules Committee, which seems indisposed toward sending it to the House floor. Hearings on the same subject which were expected to be held by the Senate Judiciary's Antitrust and Monopoly Subcommittee were postponed indefinitely because of Senate activity on civil rights, and the subcommittee's activities with regard to administered prices.

Much of this antitrust legislation will probably receive further Congressional consideration next session.

The position of the Department of Justice in the recent Supreme Court ruling on the Du Pont-General Motors case is clarified by former Attorney General Herbert Brownell elsewhere in this issue.

For an explanation of what the Supreme Court's decision will mean to chemical management, read "Mergers — and the Du Pont Case" beginning on page 44.

Taxes

Almost one thousand bills relating to taxes are currently pending before the House Ways and Means Committee.

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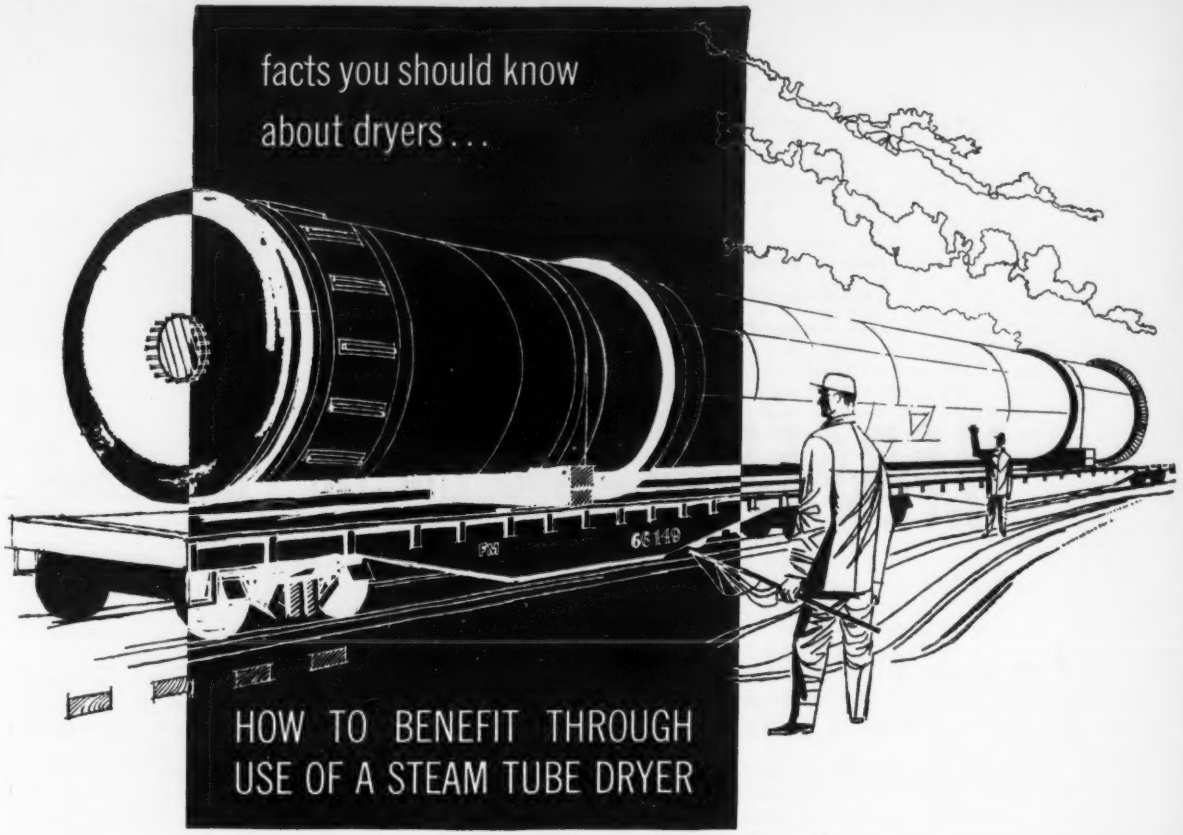

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Q. What advantages does the steam tube dryer offer *in comparison with indirect fire types?*

A. There are many advantages. One is ease of operation and low maintenance costs due to the definite moderate temperature (established by steam pressure) imposed on both the material being dried and on the dryer itself. Another advantage is that there is no furnace refractory maintenance. Still another advantage is quick "warm up" and "cool off". In many cases where the drying operation is intermittent, there is no need to shut off the steam supply or stop rotation when the wet material feed is interrupted since steam is condensed in quantity only when wet material is fed.

Q. *Isn't steam supposed to be an expensive drying medium?*

A. That depends on how the steam is used. It is true that a low overall efficiency results (often as low as 25%) when steam is used to heat air for low temperature drying. However, the Louisville Steam Tube Dryer normally utilizes 85% or more of the available heat in the steam. By combining this with a reasonable minimum efficiency of 80% in modern small steam generators (and higher in large boiler plants), you get an overall efficiency close to 70%. This compares with indirect fire dryers which develop an efficiency seldom higher than 50% and generally less.

Q. *Does material insulate the tubes by sticking to them or by clogging the spaces between tubes?*

A. Very few materials have this tendency to any serious extent and most of these, when properly conditioned before feeding, handle without difficulty. For the balance, no dryer using heated surfaces for heating the material is a proper application.

Q. *How can I be sure a Steam Tube Dryer will handle and dry my material satisfactorily?*

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Check 2932 opposite last page.

company growth by merger

Here's an explanation of what the recent decision by the Supreme Court will mean to chemical management

MERGERS MERGERS — and the Du Pont Case

HERBERT BROWNELL, JR.

THE growth of the American economy over the years has been the wonder of students of economics.

Today the United States, with one-fifteenth of the world's land and population, produces one-third of the world's total goods and one-half of its manufactured articles. The high level of production is the basis of our prosperity and of the highest average income, and standard of living, ever known. It cannot be seriously doubted that future prosperity depends not merely upon maintenance of present levels of production, but upon the continued expansion of our economy.

Concomitant with this industrial growth some observers suggest that there has been a trend toward higher concentration in American industry.

Recommending revision of the Clayton Act, the House Judiciary Committee on August 4, 1949 reported:

"Measured by practically any method and compared to practically any standard, the level of economic concentration in the American economy is high."

Evidence that the trend is continuing is found in "Concentration in American Industry," a report of the Subcommittee on Antitrust and Monopoly of the Senate Judiciary Committee dated July 12, 1957, based on data compiled by the Bureau of the Census.

The report's study of 38 chemical and allied industries shows, for example, that in 1954 four organic chemical companies accounted for 59 percent of the more than $2-billion value of goods shipped in that industry. The four largest companies in the fields of synthetic fibers, explosives, hardwood distillation, linseed oil, compressed and liquefied gases, and salt represented, in 1954, 80, 79, 76, 85, 84, and 86% of goods shipped in those respective industries. Such concentration may take on significance in view of the high capital cost of entry into the chemical field.

If degree of concentration is measured more broadly than by specific industry, exact figures are unavailable, but according to the House Judiciary Committee Report quoted above, "During the period 1940-47, some 2500 formerly independent manufacturing and mining companies disappeared as a result of mergers and acquisitions."

Review of Mergers

From January 1, 1953 through June 30, 1957, attorneys of the Department of Justice, Antitrust Division, have reviewed over 2200 mergers. Many of these involved companies on the verge of business failure or small companies combining so as to be able to compete more effectively with the dominant companies in their field.

The trend toward concentration was of Congressional concern as early as 1914. In that year, in an attempt to thwart the achievement of monopoly through piecemeal acquisitions, no one of which would have constituted a violation of the Sherman Act, Congress passed the Clayton Act, Section 7 of which read in part:

"No corporation engaged in commerce shall acquire . . . any part of the stock . . . of another corporation engaged also in commerce, where the effect of such acquisition may be to substantially lessen competition between the corporation whose stock is so acquired and the corporation making the acquisition or to restrain such commerce in any section or community, or tend to create a monopoly in any line of commerce"

Effect of Section 7

In time it had become evident that Section 7 was not accomplishing its purpose. It could not, for example, prevent consolidations or mergers effected through direct purchase of corporate assets rather than by acquisition of capital stock. Section 7 was amended in 1950 to make it unlawful for a corporation engaged in interstate commerce to acquire directly or indirectly the whole or any part of the stock or other share capitol, or any part of the assets of another corporation engaged in such commerce, "where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."

This statute is the present directive of Congress to the Antitrust Division in the field of corporate mergers and acquisitions. The Division is endeavoring to obtain prompt authoritative court decisions of the meaning of the general language of the statute. In this way, it can aid the businessman who desires to avoid any antitrust violation.

The General Motors-Du Pont case was decided by the United States Supreme Court on June 3, 1957. The Court held that Du Pont's acquisition, during the period 1917-19, of 23% of General Motors outstanding common stock violated the Clayton Act. While its decision rested on old Section 7, it provided significant interpretation of the 1950 amendment. With one exception the Court's reasoning applies equally to the present statute, since the part of old Section 7 upon which its decision rested is carried over almost word for word into the present statute. The substance of the Court's holding was:

1. Old Section 7 is applicable to vertical as well as horizontal acquisitions, *i. e.*, the acquisition of a supplier or customer corporation as well as of a competitor. For some years there had been doubts as to this with respect to old Section 7; however, the legislative history of amended Section 7 clearly indicates its applicability to all types of acquisitions, whether vertical, horizontal, or conglomerate.

2. The economic effect of an acquisition such as involved in this particular case may be viewed as of the date the Government brings its action, and is not confined to the date of the acquisition itself.

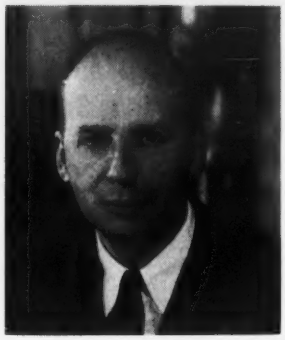
3. The relevant market in

Complications in the path of company growth by the merger route are more apparent every day — ever since the recent Du Pont decision by the Supreme Court.

Some of the apprehension that has developed among company managements has been expressed in the questions: "How will the decision affect us?" "How can we be sure that we are not violating the law?"

To allay some of this apprehension, Mr. Brownell in his article (on these two pages) suggests pre-merger clearance by the Justice Department to chemical managements contemplating mergers.

The other side of the pre-merger clearance problem, as seen by management, is on the following page — comments obtained by direct query by CHEMICAL PROCESSING . . .



Ever since the Supreme Court made the ruling in the Du Pont-General Motors case, there has been a good deal of speculation by business concerning the use to which the Department of Justice will put the ruling.

The former Attorney General clarifies the position of the Department of Justice — as it was under his leadership. It is not anticipated by the Department at the present time that there will be any major changes in the Department's position concerning its antitrust activities under recently appointed Attorney General William P. Rogers.

Receiving his law degree from Yale University in 1927, Mr. Brownell practiced law in New York City from 1927 to 1953. A member of the New York Legislature for five terms, he has also been chairman of the Republican National Committee. As Attorney General of the United States, and thus a member of the President's Cabinet, he directed the activities of the Department of Justice from January 1953 to November 1957.

A recipient of many honorary degrees, Mr. Brownell is also a member of numerous honorary organizations, from Phi Beta Kappa during his college career to the present office he holds as honorary General Counsel of the American National Red Cross. Since resigning as Attorney General, he has been counsel to the law firm of Lord, Day, & Lord.

which the effects of an acquisition is to be gaged may be the market for automobile finishes and fabrics rather than the market for all types of finishes and fabrics.

4. Because of GM's dominant position in the automobile industry, sales of auto finishes and fabrics to it comprised a substantial segment of the entire market for such finishes and fabrics.

5. Du Pont's commanding position as a supplier of auto finishes and fabrics to GM had been achieved as a result of its stock ownership and was not gained solely on competitive merit.

The Court, therefore, concluded that as a result of the acquisition "competition may be 'foreclosed in a substantial share'" of the relevant market, in violation of Section 7 of the Clayton Act.

The Cellophane Case

In a prior case against Du Pont, in which the Government had contended that Du Pont had monopolized the "cellophane" industry, the Court held that in a monopolization case under Section 2 of the Sherman Act, the test for determining the "relevant market" is whether the commodities are "reasonably interchangeable by consumers for the same purposes" or are "functionally interchangeable." The narrower test in determining the relevant market in GM-Du Pont is whether the products comprising the "line of commerce" have sufficient peculiar characteristics and uses to constitute them products sufficiently distinct from all other similar products.

In the Cellophane Case, the Court had held that cellophane and numerous other wrapping materials were the relevant market. In the GM case, however, the Court held that automobile finishes and fabrics constituted a market distinct from the market for all other finishes and fabrics. It is not clear whether or not the Court intended to scrap the definition adopted in the Cellophane Case. Since no reference was made to it in the GM decision it is possible that the Court intended that a different standard be applied in monopoly cases under the Sherman Act from that to be used in judging acquisitions under the Clayton Act. Clarification may be expected in future judicial decisions.

Members of the business community have been even more concerned over the possible backward sweep of the Clayton Act. Will every acquisition by a supplier of a controlling interest in the stock of a major competitor since 1914 be now found to violate the Clayton Act?

Two points seem especially important. First, the right of the Government to move against an already consummated acquisition has never been seriously questioned. In fact, over the years the majority of proceedings under Section 7 had related to past rather than future acquisitions. Nor again, has it ever been seriously contended that a court could not predicate some of its findings as to probable future effects of an acquisition upon an appraisal of observable market effects subsequent to the acquisition.

Second, since the GM-Du Pont decision the Justice Department has not reviewed post-1914 stock acquisitions to determine probable future effects on competition. Of equal importance are the complications which may be involved in taking action against post-1950 asset acquisitions.

Enforcement Difficulties

Equally important is that enforcement practicalities may complicate seriously any move, even after the 1950 amendments, against stock or asset acquisitions consummated since then. An important factor determining whether or not an action will be filed under Section 7 is a possibility of obtaining effective relief. Divestiture, the most effective remedy against Section 7 violations, may not be feasible if, with the passage of time, acquired assets have become intermingled with those of the acquiring company. Viewed in terms of practicability of enforcement against long-consummated acquisitions, GM-Du Pont may prove an exceptional case.

There is a further limitation on the possible backward sweep of Section 7. The merger of two competitors is in many ways different from the acquisition by a supplier of part of the stock of a customer, as in the GM-Du Pont case. The probable future effect on competition of a less than complete vertical acquisition may not become apparent until the passage of many years. A shorter period will usually suffice in the case of the merging of dominant competitors. In GM-Du Pont the Government was upheld in taking action against the less-than-complete vertical acquisition after 30 years. In the case of a completely horizontal acquisition the Court might well require that the Government take action within a shorter period.

Pre-merger Clearance

"This is all very well," I hear the corporate executive saying, "but where does it leave me? The law tells me I must not park within 10 feet of a fire-hydrant, and I know that if I park 11 feet away I am not violating the law. Is there any way I can be equally certain that a merger which my company contemplates will not violate Section 7 of the Clayton Act?"

There can be no categorical answer to this question. Since the passage of the Sherman Act in 1890, through to the present,

Brownell on Mergers *From preceding page*

Congress has purposefully phrased antitrust statutes in general rather than in specific terms. Courts and the federal agencies charged with the enforcement of those laws endeavor to apply them in accordance with a realistic appraisal of current business practices and the economic facts of life.

The businessman who wishes to avoid the consequences of a Section 7 violation will find useful the Justice Department's pre-merger clearance procedure. It is available in any case in which the corporations involved are willing to make full disclosure *prior* to the consummation of a merger or acquisition. (Details may be obtained by writing the Antitrust Division, US Department of Justice, Washington 25, D.C.)

In its administration of the antitrust laws it has been and will continue to be the policy of the Department to institute actions aimed not at proving theoretical economic or social doctrines but at making prompt and practical strides toward eliminating in their incipiency restraints on entry, monopolization, and control over prices. We recognize that the antitrust laws stand as one of the prime supports for our prosperous and free competitive economy. All Americans have a vital stake in its preservation. ■

Above, Mr. Herbert Brownell, former Attorney General of the United States, has outlined the position of the Department of Justice concerning mergers since the Du Pont-General Motors decision by the Supreme Court. Mr. Brownell suggests pre-merger clearance by the Government to insure non-violation of the antitrust laws.

Questioned by CHEMICAL PROCESSING, managements of chemical companies presented the other side of pre-merger clearance problem.

Is pre-merger clearance practical?

Part of the problem of pre-merger clearance is that changing conditions within and without a business can invalidate a legal action to the degree that it becomes a violation of antitrust laws. Chairman of Standard Oil (Ind.) Robert E. Wilson comments:

"With regard to the General Motors-Du Pont case, it is correctly stated that members of the business community have been concerned by the decision. I don't believe the concern will be removed by any suggestion that the General Motors-Du Pont may prove to be an exceptional case.

"Staff members of one Congressional committee have already hailed the decision as opening possibilities for attack on vertical integration not previously possible under the antitrust laws.

"Neither do I believe the businessman can receive much assurance from pre-merger clearance procedures of the Department of Justice. If the economic consequences of a merger are to be assessed not at the time of the acquisition, but many years thereafter, it appears that the Department can only tell the businessman that his proposed merger is legal today.

"Changing conditions, which may be beyond his control, may convert an acquisition, once legal, into an antitrust violation. Pre-merger clearance cannot assure the businessman that he may not be subject to attack in the future.

"In regard to mergers in general, I am disturbed by the belief that they are a direct cause of an increasing degree of industrial concentration. Insofar as I know, as often as this has been alleged, it has never been shown to be a fact.

"The lack of any reliable data relating mergers and concentration was pointed out by Jesse J. Friedman, economic consultant to the Senate Antitrust And Monopoly Subcommittee in a report released early in 1957. Certainly the Subcommittee's more recent report on 'Concentration in American Industry' establishes no such relationship.

"I am also disturbed by references to this report as evidencing a high degree of concentration in the chemical industry. The statistical inadequacies of the report have been well covered in pamphlets issued in July by the Chamber of Commerce of the United States. One of the primary difficulties with the 'concentration ratios' shown in the report is that industries are grouped according to primary products following Census Bureau classifications.

"I would strongly suspect what is classified in the report 'Concentration in American Industry' as the chemical industry covers only a small fraction of those companies which engage in the manufacture of chemicals. If this is so, the ratios referred to as evidencing a high degree of concentration are considerably overstated . . ."

An indirect result of the difficulty of consummating a merger might be a more careful approach to merger plans. Robert V. Edwards, President of American Pipe and Construction Company, said about this phase:

"It would often be convenient to the businessman to have an immediately available and dependable means of evaluating the future result of an impending decision. This is no less true in the realm of mergers than in any of the other areas in which long-range plans are essential.

"If we are willing to agree that pre-merger clearance is a proper function of the Justice Department, and I am not at all sure that it is, we must still face the obvious fact that not even so-called 'full disclosure' would always impart the necessary degree of wisdom to the Department's staff. In addition, the time element alone seriously limits the effectiveness of a clearance program.

"While the decision in the Du Pont-General Motors case may result in a more careful approach to merger plans by business, I do not believe the present trend will be appreciably affected. It is neither probable nor desirable that the number of economically ill-advised mergers be reduced by such influences. This is clearly the responsibility of business alone.

"The merger problem and its relationship to monopoly must be partially solved by economic realities and by businessmen aware of their responsibility to the general economy."

And S. Askin, President of recently formed Heyden Newport Chemical Company, says about pre-clearance of proposed mergers with the Department of Justice:

"Based on our own experience, pre-clearance would not be practical or even desirable."

President H. Krehbiel of Catalin Corporation perhaps has an answer to why the recent rush of merger actions. He says:

"As long as we little fellows have to pay the same corporate taxes as the big fellows, we will continue to be under great pressure to yield to merger offers."

The opinion of the legal department of a major chemical company may serve as a summing up:

". . . The suggestion that a projected merger be reviewed by the Justice Department in accordance with the economic facts of life is unreal. The unreality is painfully apparent in that the antitrust statutes are purposely vague. No Justice Department review can make the statute any less vague; it can only make clear a particular administrator's interpretation of the law at a particular moment. Further uncertainty, and further interpretations of the law, remain to be dealt with regardless of any clearance procedure.

"A more vivid illustration of this unreality than the Du Pont-General Motors case can hardly be imagined. At least seven Departments of Justice must have held office between the acquisition of the stock and the attack on it. All Departments presumably knew the facts as the acquisition was publicly known for the whole period. Clearance by Justice today is no protection for tomorrow.

"The list of uncertainties in antitrust law is seriously alarming. The Du Pont case is another entry on the list — a serious entry in that its application apparently is governed by hindsight, and normal causal relationships are totally ignored in taking the backward view.

"For example, the finding that competition was eliminated in a large share of the automobile finish market ignores the fact that the size of GM's market share depended fundamentally on the growth of General Motors between 1919 and 1957. If General Motors had been Packard, Jordan, or Reo, there would have been no Du Pont-GM case.

"In short, in its conclusion that a substantial part of the automobile finish market was affected, the Supreme Court simply ignored the numberless factors which combined to cause the result, and apparently attributed the whole thing to an irrelevance — the corporate relationship.

"Businessmen apparently now must judge the effect of a merger by hindsight. In so doing, they must assume that everything which happened after the merger happened because of it."■

Venema

From page 40

rubbers may replace older ones. An improved butyl rubber process shows promise in the tire casing market, with the potential of exceeding the volume lost when tubeless tires reduced the amount going into inner tubes. Increasing use of antioxidants and antiozonants may also change the demands for certain synthetic rubber types.

There always remains the latent influence of new processes upon demand for any given petrochemical. Production of acetylene from natural gas today is relatively small compared to that from carbide, but the economic potential of acetylene derivatives is tremendous if a good low-cost process can be perfected. Similarly, experimental plastics suddenly will become attractive when industry develops a good, cheap method of making propylene oxide.

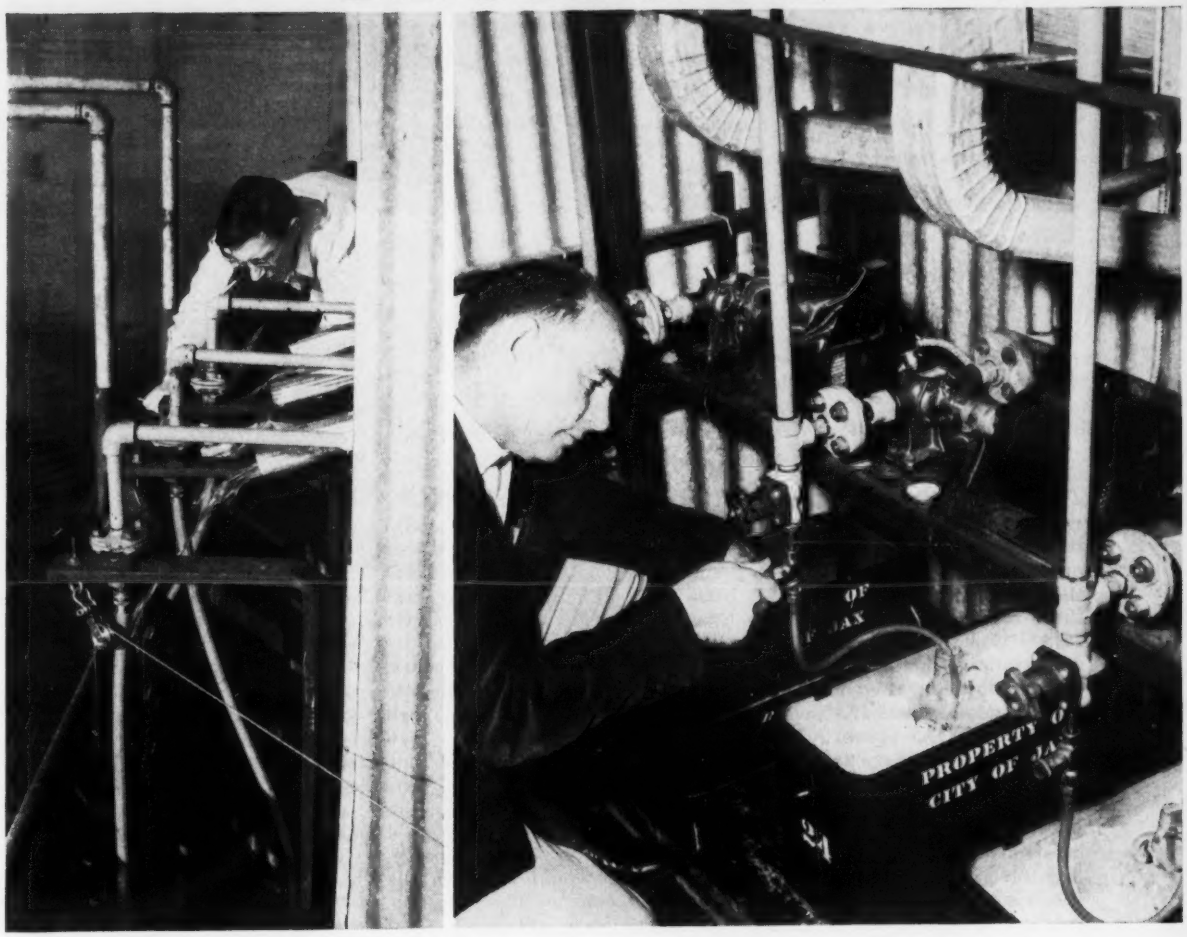
No Lack of Markets

Despite reports and predictions of reductions in capital expenditures throughout US industry, petrochemical plants continue to expand in size and increase in number. We at Universal know of very few projects that were cancelled in 1957 because of lack of markets or financing. However, there were several cases when petrochemical companies would have preferred not to increase their facilities, but the need to meet competition and increase the quality or variety of products has made plant construction necessary.

The picture can be changed overnight by perfection of a new process that will open new markets to petrochemicals. As an example of what can happen, agricultural economists already are speculating over the effect of a newly developed UOP process combining aromatics and carbohydrates to produce both primary and intermediate chemicals.

Perhaps 1958 will see the petroleum and chemical industries being joined by a third partner — agriculture — to produce new products for consumers, new sales for industries, and an even stronger economy for the nation. ■

B.F.Goodrich



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When Congress recessed last summer, they left a hefty pile of proposed legislation and testimony of the controversial food additives bills. Since they will retackle this project this month when they reconvene, let's take a close look at —

STATUS OF FOOD

Where Does It Stand Now?

As the Food, Drug, and Cosmetic Act of 1938 now stands, there is no provision that requires the testing of food additives prior to their use, nor is there any requirement that the FDA (Food and Drug Administration) be told that an additive is being used in food.

Both industry and the Government (the FDA) agree that the act should be modernized to require notice of use of additives and to require safety-testing by the manufacturer of the additive before its use. Both favor changing the present law to permit use of substances which, although deleterious when used in excess, may be beneficial when used in small, controlled quantities.

However, there is disagreement between industry and the FDA regarding the *method* of control that the Government is to have over use of additives, and also disagreement over the *definition* as to the usefulness, or functional value, imparted by additives.

In hearings before Congressional committees last summer, Lawrence A. Coleman, chairman of the Manufacturing Chemists' Association's Chemicals in Foods Committee, testified that while the FDA-sponsored bill (H. R. 6747) contains many good features, industry does not believe the administration should be granted power to "license" use of an additive, which in effect this proposed law does.

The FDA would like to have this "licensing" arrangement written into a new bill. At present, though, the FDA enjoys a "policing" power.

Under the present "policing" control powers of the FDA, a maker of a food additive could tell the FDA, "I have tested this substance and found it safe for use in food. Here are my test data. I intend to sell it two months from now."

The power the FDA now has, permits them, if they object to the use of an additive, to seek issuance of an injunction by a Federal Court against the sale and use of the additive. The opposing views as to whether an additive is harmful are then aired before a Federal judge. This judge would consider the pros and cons of the disagreement.

Under "licensing" control, a manufacturer of an additive would have to submit safety-testing data to the FDA, and would have to obtain specific FDA approval *before* this additive could be sold or used.

Under the proposed law which in effect permits "licensing," any decision on the part of the FDA as to whether an additive may be used would be carefully considered. This could be a time-consuming operation, with an understandable reluctance on the part of the FDA to give a definite answer.

Industry feels that a "licensing" provision would seriously impede research and restrict further progress in food chemistry.

Another objection to the FDA bill is the omission of a "grandfather clause." This clause would provide that all food additives in use at the time the new law becomes effective would continue to be policed under the old law. In this way, industry argues, extensive pharmacological studies by processors who had been producing food additives whose safety had been established by use over a period of years, would be unnecessary.

The FDA contends that although many of the chemicals now in use are entirely safe and would be exempt from pretesting, those not generally recognized as safe by qualified experts would not be exempted, even though in use for some time.

After the testimony by food industry members Health and Science Subcommittee Chairman, Representative John Bell Williams (D., Miss.), requested the National Academy of Sciences to provide a panel of experts to discuss problems involving testing and evaluation of the safety of chemical additives.

In substance, the panel advised Representative Williams' committee that chemicals are absolutely necessary in the production, processing, and storage of foods. To require that every one be pretested to determine its possible cancer-producing properties would be an impossible task. The experts agreed that there is no evidence that any cancer-causing additive is presently being used in foods.

These panel discussions closed the hearings until the beginning of this 1958 session. Further hearings — including the statements by the FDA — were postponed until now.

CHEMICAL PROCESSING has asked the Commissioner of Food and Drugs, George P. Larrick, to tell us the reasons behind the Government's support of the FDA-sponsored legislation.

We also asked an executive of an important food and cosmetic chemical manufacturing concern to tell us what he feels would happen to the industry if the present proposals are enacted into law. ■

GEORGE P. LARRICK, Commissioner of Food and Drugs, tells what's behind the Government's proposals—

There appears to be substantial agreement by the food and chemical industries and the Department of Health, Education, and Welfare:

1—That there is need for new legislation to regulate the addition of chemical additives to food.

2—About what additives and substances the legislation should cover.

3—That certain scientific data should be submitted to the Government in support of a request for approval of an additive use.

4—That any additive already in use when new legislation is enacted should, if not generally recognized as safe as a result of testing or extensive use, meet the same safety clearance procedures as a new additive.

There are other areas where there is still discussion about the most desirable method of achieving control. The principal ones are:

FUNCTIONAL VALUE: The Administration bill now before

ADDITIVES LEGISLATION

Congress (H.R. 6747) requires a poisonous or deleterious additive to have functional value (something that benefits the consumer directly or indirectly, and thus necessarily benefits the manufacturer) before it is allowed in food. This is an important safety factor. While scientific testing can establish the safety of an additive beyond a reasonable doubt in the light of current knowledge, its absolute safety cannot be assured.

It should be remembered that the problem here is whether active poisons shall be added to the food supply. The purposeless addition of toxic chemicals to food or the addition of excessive amounts of poisonous materials, even if the practice seems a safe one, is not a sound pure food policy.

If legislation were passed without the functional value provision or an equivalent, the Government would be forced, upon a showing of safety, to set tolerances for these notorious old adulterants and then to try to prevent their illegal use where possible under other sections of the law.

The functional value provision of the Administration bill is a relaxation of the requirement of the existing law. Business does not decide today whether a poison may be added to food. It must establish the necessity of adding it. The proposed bill substitutes the reasonable requirement of functional value.

COURT REVIEW: The Administration bill provides that controversies between industries and Government as to the safety of an additive shall be resolved by the standard administrative procedure approach in the present law. This permits every known fact bearing on safety to be evaluated and permits scientists, selected because of their scientific ability, to analyze the evidence and recommend the decision. It gives full opportunity for hearings, requires findings to be based on the record of the hearing, and provides for judicial review on the basis of that record.

The counter-proposal is that the safety of an additive in case of dispute should be determined by a US District Court.

We are not discussing the enforcement of a law or rule; under the Administration bill, enforcement would continue to be carried out in the District Court. Rather, we are discussing the making of a rule which is traditionally carried out by the administrative procedure approach mentioned earlier.

The adverse character of District Court proceedings, and the complex rules of evidence that prevail, would not encourage the compiling of a complete record of pertinent scientific data; nor is the lay judge (and lay jury where employed) the person who should have to evaluate complex scientific data and decide what amount of poison may be safely incorporated in the food supply of the Nation.

The Judicial Conference of the United States, which represents the Federal Courts, opposes the assignment of this rule-making function to the courts.

THE ADVISORY COMMITTEE PROCEDURE: The Administration bill proposes that in case of dispute between Government and the proponent of an additive, either may get the scientific question reviewed by an independent group of recognized scientists selected by the National Academy of Sciences.

This group, after reviewing available data, would submit a report and recommendations to the Department of Health, Edu-

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JACK N. FRIEDMAN, Vice President, Florasynth Laboratories, Chicago, Illinois, gives an industry view of the proposed legislation—

WHEN the Food and Drug Law was enacted in 1906, many members of the food and drug industries believed such legislation would spell the doom of their enterprises. Nothing like this has happened. Food and drug manufacture became larger and better because of tremendous growth in population, better living standards, improved transportation, advancement in science and technology, and many other factors which have all contributed to a vast increase in production.

In 1938, the act was revised and many new provisions were added. Coverage was extended to cosmetics, and our friends in the beauty products business thought their industry would perish and disappear from the earth. Today in all of these fields — foods, drugs, and cosmetics — the growth has been fantastic.

However, it is a mistake to conclude that the greater the number of laws and regulations which are promulgated to govern an industry, the more it will prosper. There is always grave danger in too many laws; the dictum that a nation is governed best which is governed least still stands.

The Food and Drug Administration believes there is need for new legislation to regulate the use of chemical additives in foods. Generally, the food industry is not opposed to legislation regulating the use of food additives provided that such legislation is based on sound science and sound law. The new legislation proposes to place the burden of proof on the manufacturer, and not on governmental authorities.

I do not think the often-used analogy by some opponents to this section of the proposed new legislation is valid. They claim that, because of our belief that a person is innocent until proven guilty, the same type of legal thinking should be applicable to an additive.

Certainly additives are not persons in the most remote sense. Nevertheless the fact remains that were the regulation made legal in its proposed form it might discourage much progress and research in the food industry. There must be some hap-

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What do YOU think?

Do you agree with the opinions stated in this article? Or do your views differ? You can say what you think in the Letters from Readers column on page 12. Send your comments to:

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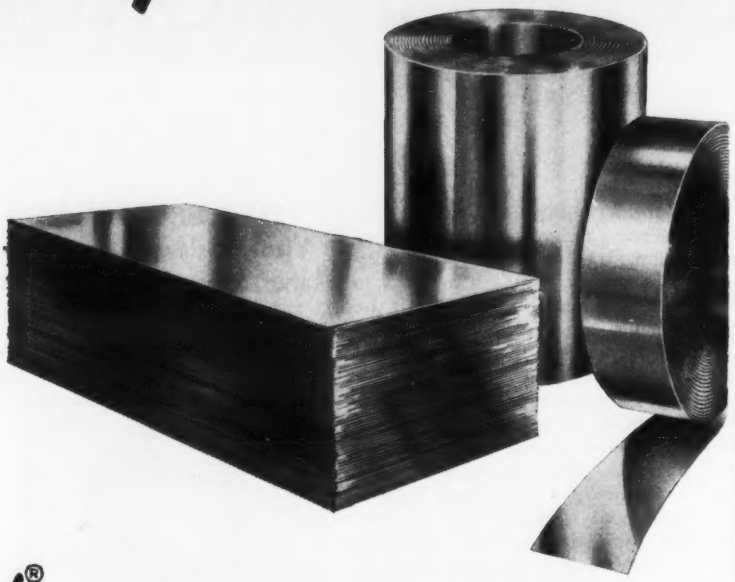

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Additives—Friedman

From preceding page

py medium between trying everything and not trying anything.

There is one very serious objection against placing the burden of proof on the manufacturer, and this objection is really valid. No one questions the principle of "equality before the law."

It would not be too difficult a task or too expensive a project for a large food company to provide scientific proof that an additive it plans to use is harmless within the meaning of the proposed legislation. However, this would prove most burdensome for a small food company. I think the difficulty will be resolved but it is too early to say just how this will be accomplished.

It is not possible here to examine the various points in the proposed new legislation, but some additional comments may not be out of place even though these are the opinions of a layman.

While the Federal Administrative Procedure Act of 1946 set up general standards of procedure for all agencies, so that each agency is prevented from setting up its own procedures, food manufacturers often prefer to go to a United States District Court in case of dispute because they feel they cannot always have complete confidence in the combination of prosecuting, legislative, and judicial functions that are present at a hearing.

This is a serious obstacle connected with all administrative agencies, but it is often caused by their very nature. No one contends these administrative laws are perfect any more than any other human laws are perfect.

With regard to the proposed change in the law which would require a deleterious additive to have functional value before it is allowed to be in food, unfortunately there does not seem to be agreement as to just what "functional value" is. We hope this difference of opinion as well as the other difficulties will be settled so that there can be close cooperation between Government and Industry. ■

National Starch's President Frank Greenwall

Among the most valuable property any company can have is its management group, well trained, loyal, and familiar with the problems of the organization. And one of the main concerns of the management at National Starch is to maintain a second and third team who can step into the first string shoes when they are needed. CHEMICAL BUSINESS talked to the company's officers and here reports on . . .

"Depth" In Management At National Starch

Among the current hassles concerning management techniques is the one concerning executive talent. Do you train your own or is a company better off in buying talent away from other companies? There is much, certainly, to be said for the former — greater loyalty, more stability resulting from fewer upsets in the management group, probably lower costs in the long run. And there's also something to be said for buying management talent. A broader experience in problems in the field is one advantage, also a man from another operation can bring to your company a knowledge of "how somebody else does it".

But how about a plan that combines the best points of both philosophies? Look at National Starch Products. They train their own people, and can point to the growth and vigor of the company as proof of their plan's effectiveness.

President **Frank Greenwall** states National's policy rather simply: "It's the depth in management that counts. The second string must be trained and the best way is to point them in the right direction and let them have responsibility. This gives them confidence and prepares them for emergencies and allows for easier transfer of authority when the need arises.

"We believe in really

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"Depth" at National

— *From preceding page*

delegating authority. I don't want copies of everything that goes on in the company, nor do other members of the management team; that puts the responsibility right back in areas where it is not wanted and destroys the basic purpose of our depth of management program. I believe in letting people learn by doing — allowing them to make and correct their own mistakes. This may sound strange but it has proved a valuable adjunct to their training and there is much to be gained from this approach."

This statement is typical of the management concepts that helped bring National's sales from under $5 million twenty years ago to something like $44 million when all of the 1957 figures are in.

National's "depth" program isn't basically complicated. It consists of allowing the younger men to become familiar with various operations within the company. But while simple in concept, the program has considerable effect on the company's operation.

"By rotating a man through several departments and areas in the company, he soon has a better understanding of the many requirements for a profitably smooth operation," Greenwall states. "This often results in a 'horizontal' promotion rather than a vertical one, but this policy is one of the keys to the success of such a program."

"It's expensive," he continues, "but necessary in a time when executive talent is in such short supply. We want to promote from within so that our deserving young men know that there's a real future with the company.

"They know that good performance guarantees promotion and that this is the only criterion used in advancing our people—no favorites, no neophytes. Promotion from within assures a higher batting average. Our people know each other. It's called 'inbreeding' but the results are better human and business relations and, on balance, worth the risk."

Probably the best example of what National's "depth" program can produce is **Don Pascal** who came up through the ranks to the Executive Vice Presidency. A veteran of 28 years of service to National Starch, he has held administrative positions in every part of the operation from sales to research.

Says Pascal: "Besides the considerable value of our training program in terms of providing a stream of executive talent it, of course, allows us much more flexibility in our operations. Our people not only just know something of the other divisions but are actually aware of the problems to be faced in other parts of our operation."

On decisions: "We operate on a true 'team' principle," Pascal continues. "We encourage our people to express their opinions honestly and they know that their thoughts and suggestions will be considered carefully by the management and executive committees. Decisions are made only be a majority vote of our management committee. In this way we're fully able to benefit from the broad experience we give our people."

On research Greenwall explains: "Research is the most potentially dangerous function in a business. When a sales program or a production unit is on the wrong track the problem can be spotted quickly. Poor labor relations result in strikes, poor customer service results in lost sales. In each case, decisive corrective measures can be initiated almost at once. This is not true with research. If your research program is off the track, it may be as long as ten years before the full impact is realized. By then your competition may have already passed you with newer and better products.

"Haste in introducing a new product, improperly or inadequately researched, can result in a product of poor quality. The only logical solution is topnotch researchers charged with the responsibility of keeping your company on top. They must have adequate funds and adequate support from management.

"Our own research? Probably our greatest growth in the next ten years will stem from the production of more of our own raw

National's Executive v-p, Don Pascal

materials, necessitated by the introduction of new chemical products and improvements in the materials which constitute our present line. So, certainly we rely on our research people to a great extent. One out of seven National employees is engaged in research, product development, or technical service. This ratio is exceptionally high in our field of activity."

Major responsibility for National Starch's research activities lies with the Technical Committee whose purpose is to review on a regular monthly basis the status of current research projects, initiate new ones and cancel those which give indication of being unprofitable.

Composed of Don Pascal and vice-presidents **Dr. C. G. Caldwell,** research; **Jim Dillon,** resins; **J. F. Fitzgerald,** starches; **Dr. R. W. Merritt,** manufacturing; and **S. F. Thune,** adhesives; the Committee represents 135 years of service to National Starch, with the "fledgling" having already passed the seventeen year mark. Such service records are the rule rather than the exception.

Resin division v-p **Jim Dillon** continues on research: "National's product lines cover a rather broad range from starch through PVAc to particle board for construction. And while some of these products are seemingly unrelated there is always a logical progression from one product to another. This will always be true in our future activities: There will always be a good logical reason relative to our current products for launching into a new field. But you can see that gives us a pretty broad area to work in."

Pascal on manpower: "Despite reports of an easing of the technical manpower shortage, it just isn't the case yet for the kind of people we need. And I'm pretty sure that we'll always have a place for the caliber of man who will fit into our group.

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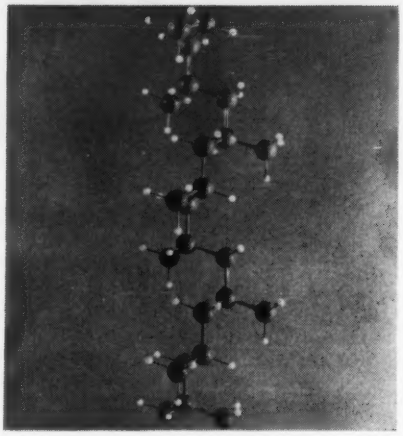
CP Our Growing Industry



Isotactic structure of polypropylene molecule

Polypropylene Operation Promises Vast Effect On Plastics Business

The host of US polyethylene producers, intent on watching the tremendous growth of capacity over the past months, now may have something even more disturbing to watch — Hercules' new polypropylene unit just on stream at Parlin, N. J. The 20 million annual pound operation is the first US plant to produce the new plastic although Montecatini has had a 15 million pound unit running at Ferrara, Italy, for a number of months.

Little is known about the Hercules plant or process but it's described as "at least similar" to Hercules' Ziegler high-density polyethylene process. The propylene feed stock will be furnished by Sinclair when that company's facilities are in operation but is now trucked in from other sources.

Although long touted as a comer, polypropylene has been pretty much an "unknown quantity" until a few weeks ago, and samples of the material still aren't plentiful. Hercules has had a small amount of sample resin out to a few molders and converters for some months, but the Italian company's material was virtually non-existant in this country until a month or so ago.

Reactions Vary

Reactions to the new material depend on where you look. The few molders who have seen and used the plastic are all pretty enthusiastic over its properties. At the other end of the scale, polyethylene producers — particularly some conventional (low-density) producers — are something less than enthusiastic about it. Some, indeed, would like to pretend that it doesn't exist.

But whatever the competitive views, polypropylene promises to have a tremendous effect on the polyethylene markets if not on the whole plastics industry. Here's why: Although the current price is high (Hercules has tagged its material, tradenamed Pro-fax, at 65 cents per pound; Montecatini's imported material will be in the same range when import duties are included) the cost to the customer will fall sharply as soon as volume production is reached — or, as soon as another volume producer goes on stream. A Hercules spokesman explained that "There's no real reason why polypropylene won't be priced in the same 'range' as polyethylene, although it

may always be a little higher than high-density polyethylene as the high-density plastic will ultimately be a little higher than the conventional material."

This is all quite reasonable to expect. Production costs on polypropylene don't appear to be out of line with the other polyolefin production costs, and the raw material price will probably remain about the same or, indeed, a little lower than ethylene.

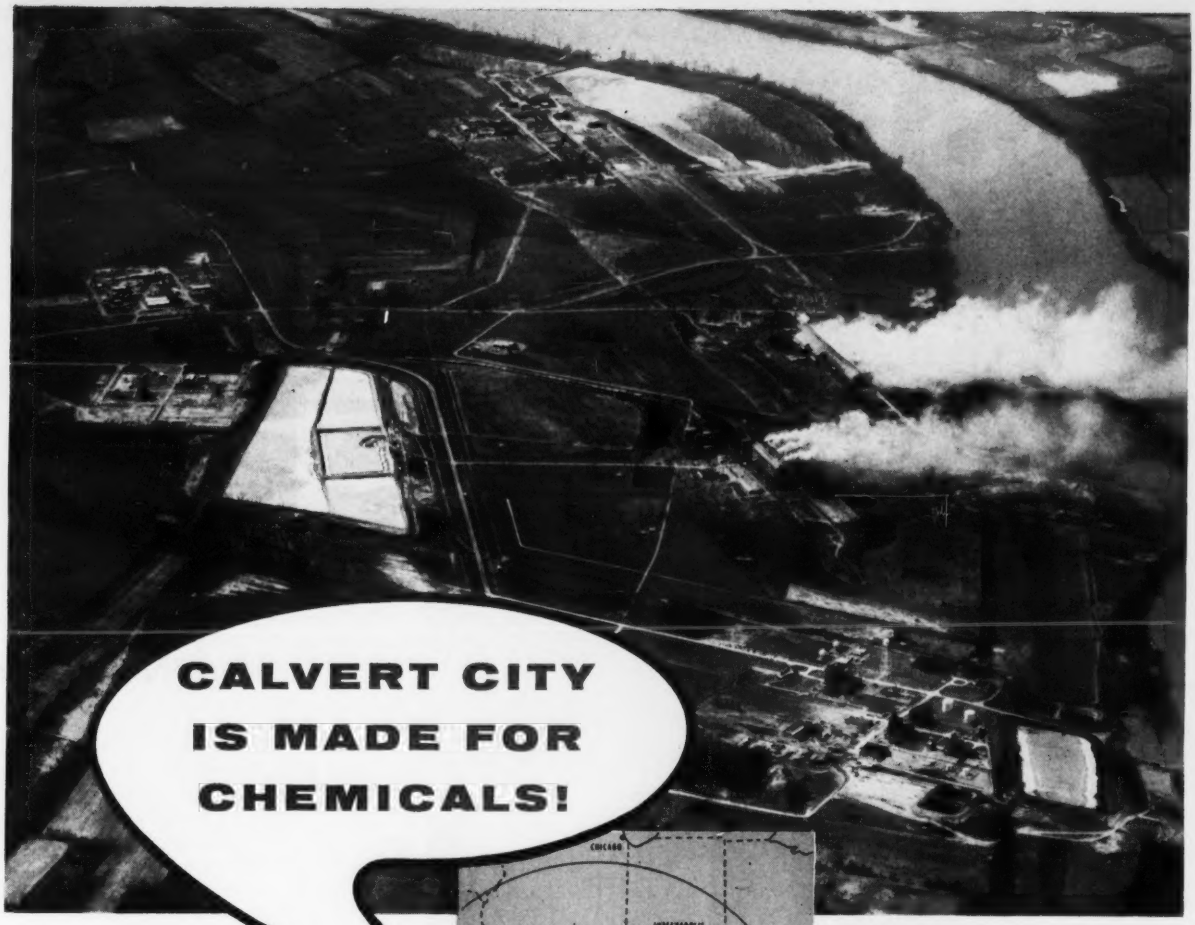
The dollar cost isn't the only factor, however. Another thing to consider is the density of the material. While the polyethylenes on the market today run in the density range of 0.92 to .935, some over .94, polypropylene is around 0.90, automatically going three to four percent further when converted to finished products. But while this is important to a molder using thousands of pounds of polyethylene, the density break of polypropylene really becomes impressive when compared to materials such as butyrate or nylon with much higher densities. In some cases polypropylene may yield up to 40 or 50 percent more parts per pound than do these higher-density materials.

This isn't to suggest that polypropylene will necessarily do the same job in all cases as will nylon or butyrate. But it's a good bet that a customer will give pretty careful consideration to the plastic when he's now paying up to $1.35 per pound for nylon.

Montecatini has shown considerable interest in polypropylene fibers but the scope of the US synthetic fiber industry, and the range of fibers now available, might tend to discourage an American producer's early move into the field, at least until it's pretty well established in some other markets.

Although the impact of the new plastic will be felt in almost all corners of the plastics industry, it's a pret-

To page 58



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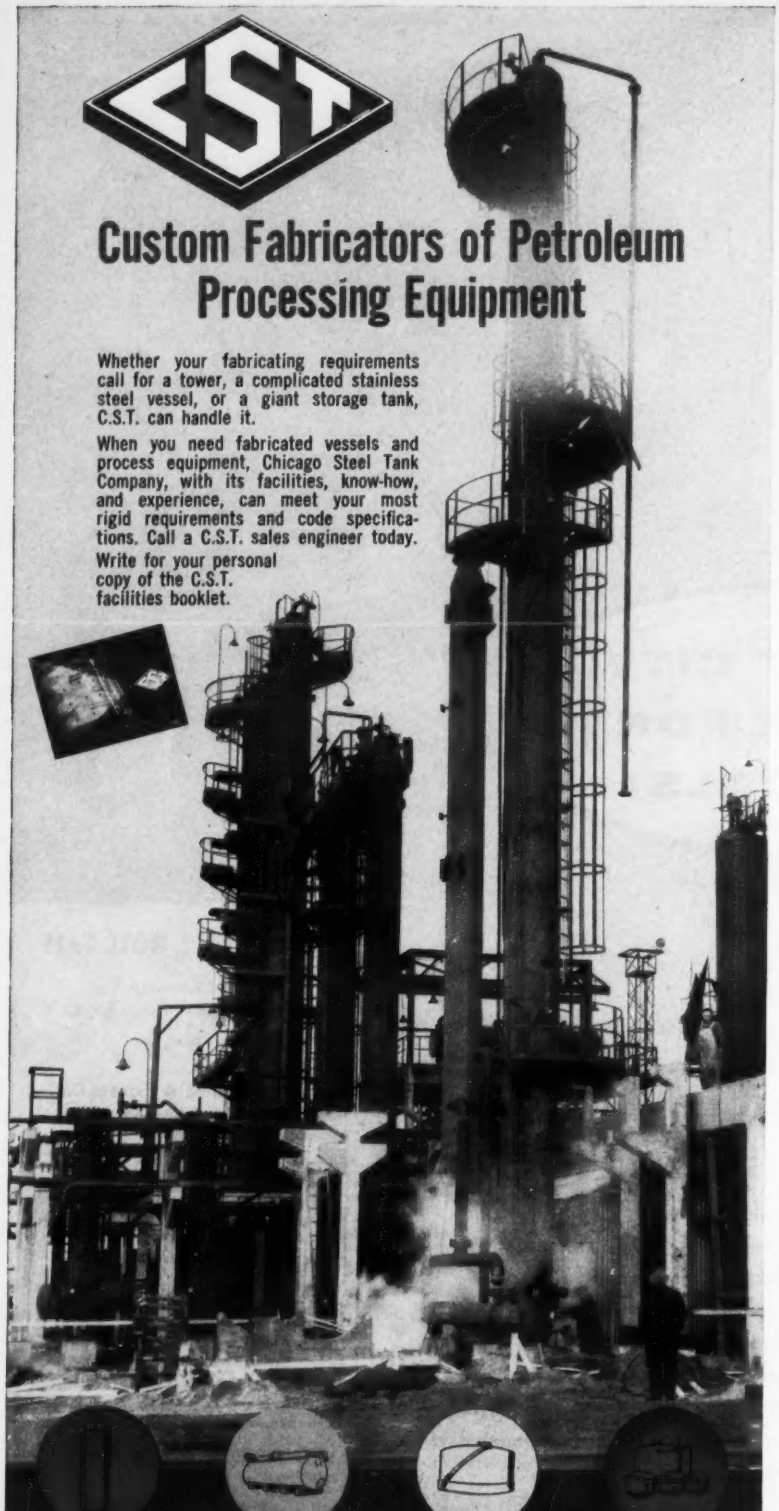
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cp Marketing

Applications research for urethanes: Urethane foam is being tested for building insulation in Du Pont's new urethane foam lab. Excellent insulating properties of the foam point to numerous applications in the construction field

Urethane Business Gets Boost From Newer Raw Materials

While the urethane business can't really be said to be in a muddle, it's certainly fair to say that there is a small amount of confusion in the field these days. Yet it's also fair to predict that the field will shortly come out of the confusion in a better position in markets where it should have been strong a couple of years ago.

When the material first became available commercially a while back, predictions were made that it would replace or at least substantially usurp the markets for foam rubbers. And with good reasons. The materials cost less, and aren't affected by price fluctuations like natural rubber. Foam manufacturers can make a pretty uniform product now and the material can be varied to suit almost any reasonable application.

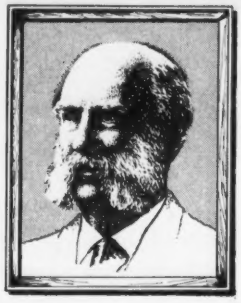
But to date it hasn't quite worked out as expected. In the field of seating, for example, manufacturers (and presumably, customers) complain that the "feel" isn't quite what it might be. And the same is true of a number of other fields; the salesmen were told that "it just isn't quite what is needed for this job."

And foam rubber still held the lion's share of the markets.

But now, although sales volumes are still less than gratifying, enthusiasm among urethane and urethane raw material makers is at a new high. Here's why: Most of the difficulties experienced with urethanes made from polyesters (reacted with the diisocyanates to form foams) are eliminated with foams made with polyethers, and at a lower cost in the bargain. (A typical mattress made of polyester foam might have material costs of something on the order of $17; the same mattress made with polyether foams will have material costs of about $11.) And although this will almost certainly give the material the boost it has so long needed, further developments may well improve the situation even more.

Here's the way the foam markets seem to be shaping up: In 1956 the total urethane foam market was about ten million pounds, 9.4 million resilient and about .6 million rigid; and virtually all made with polyesters. Last year the sales jumped to about 20 million pounds, with 18 million of these resilient. And of the 20 million pounds, about seven million were

Excerpts From The Chemical Hall of FAME



James Mason Crafts
(1839-1917)

In 1911 Crafts was awarded the Rumford medal by the American Academy of Arts and Sciences for his investigations into thermometry that were so accurate they are still regarded as classics.

By 1911 Foremost's El Dorado Division had been stressing purity and uniformity in their production control for nearly two decades.

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Check 2939 opposite last page.

polyether foams.

Observers are looking to tremendous gains in the next five years or so — 1960 should see sales of around 120 million pounds of foams, guesses for 1962 are running everywhere up to 400 million pounds, although 150 to 200 million might be a realistic figure.

But now when the polyethers seem to be the answer to so many problems for the urethane people, something else seems to be coming in from left field — dimer acid polyesters. These materials (actually polymers of fatty acid esters) are currently running a little higher than the polyethers in cost but another factor enters the picture: Foam prices are usually quoted in cubic feet and all indications are that dimer acid foams of a lower density might well do the job of polyether foams of higher densities. If it works out this way commercially, the new materials are predicted to give a price break of up to 20 cents per cubic foot.

This all doesn't necessarily point to a victory of one raw material over another. Both polyesters and polyethers have their own strong points. For example, the polymerized acid foams have a higher water resistance than the polyether foams, but fall down somewhat in solvent resistance. All of which suggests that a large quantity of the foams in the future will be tailored more or less to the end uses, leaving open markets for both raw materials.

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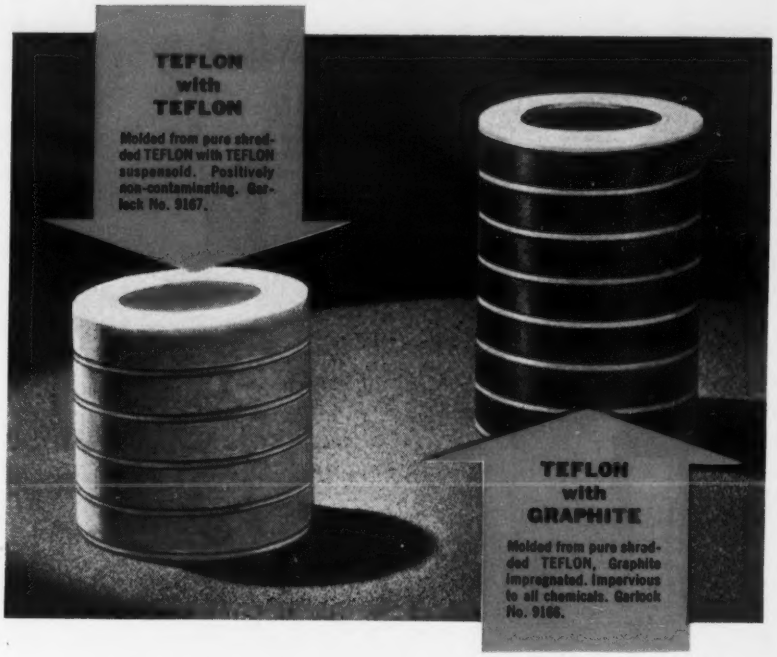
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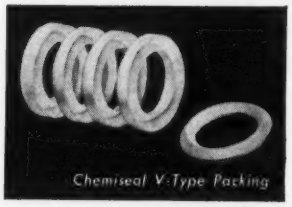

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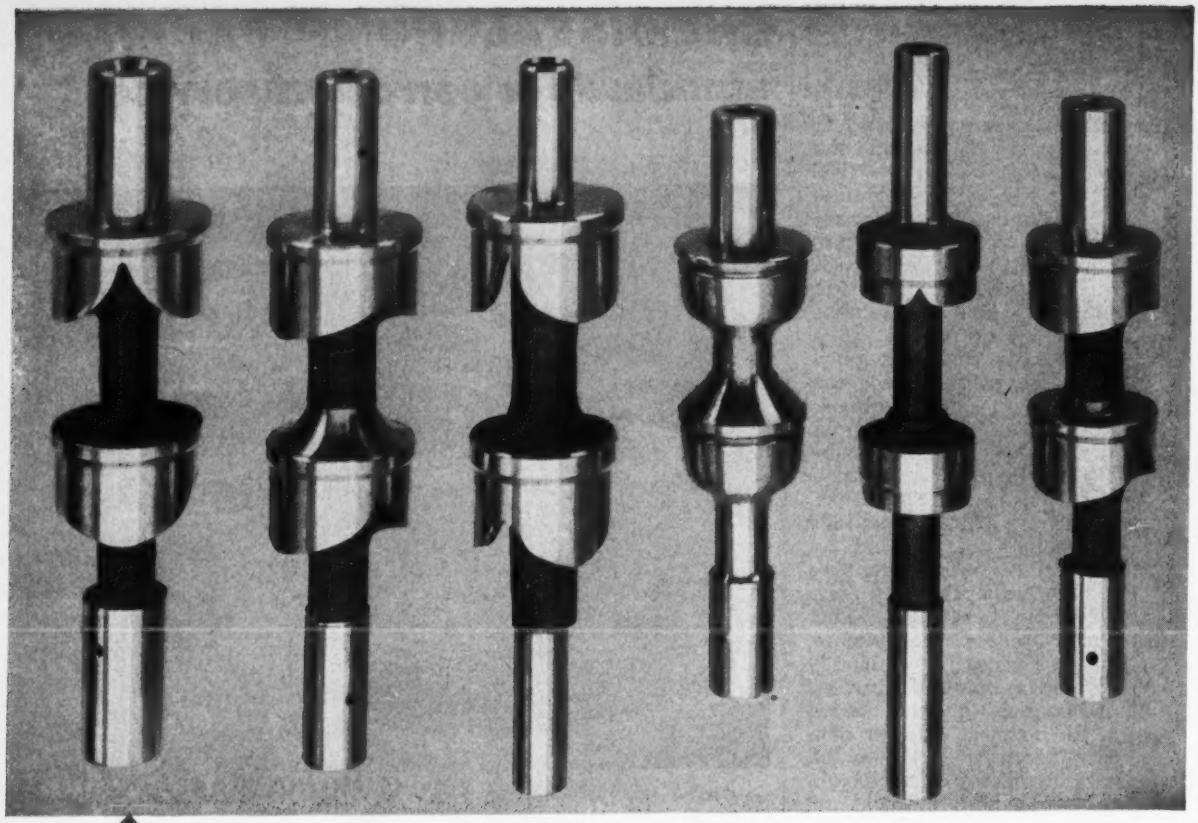


Inner secrets of inner valves

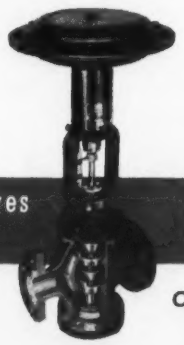
FACTS EVERY CONTROL VALVE USER SHOULD KNOW

This is a rare photograph . . . presented in a completely unretouched form. It shows the inner valve of leading makes of diaphragm control valves. The inner valve determines the control result.

The most amazing fact is the size . . . all are *listed* as two inch valves. All are high lift. But compare them.

Note the KIELEY & MUELLER inner valve at the far left. It equals the others on every point of consideration; exceeds on many. Look at the diameter across the skirt . . . that's one reason for the remarkable C_v of K&M valves. Look at skirt length; the solid, not fabricated, design. Measure the rugged guide posts and the large column. Examine the machining and the super-finishing.

It's no wonder . . . K&M is *the valve that likes to be compared.* It's a better valve and a better value by every measure of comparison.



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Check 2941 opposite last page.

polypropylene

From page 55

ty safe bet that one of the first polypropylene targets will be the film field. And a number of facts point to considerable success: The material — disregarding, for the moment, the cost — will do everything that polyethylene film will do, in some cases a little better. But polypropylene has one outstanding advantage — its clarity. Although not actually as clear as cellophane, it has pretty much the same appearance. This is hitting the polyethylene makers — particularly the low-density makers — where it hurts. Lack of clarity has always been a pretty serious merchandising problem among film makers, particularly with heavier material.

Now with the current question — "Who First?" — answered, a number of other questions occur, notably "Who Next?" This one's particularly difficult to answer for a number of reasons. For one, there are ten or twelve companies who might logically produce the material and, if polypropylene pans out as well as expected, might find it quite advisable to do so. Du Pont is probably the best bet to get into the polypropylene business, although Carbide isn't to be discounted and Allied is known to have been pretty close at one time.

Nor is a US plant for Montecatini to be discounted (CHEMICAL PROCESSING, Dec., page 74). The advantage it held in being the first company producing the material is fast slipping away. It's a pretty safe bet that the company will be making a decision rather quickly now.

The feelings of the polyethylene people seem to have been pretty well summed up by a high spokesman in the field: When asked about the rush of polyethylene capacity in the face of these new developments his answer was: "I'd sure hate to be responsible for a recent decision to get into polyethylene."

CP Finance

Volume in Chemical Lines Growing At Eastman

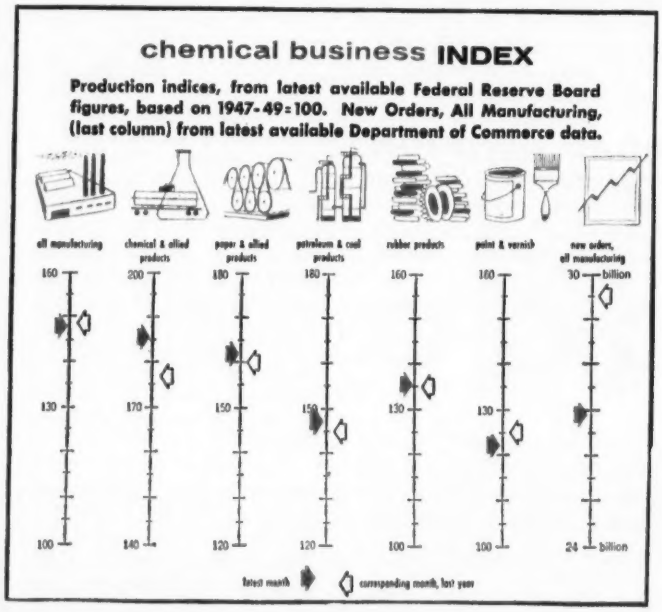
William R. White
Market Analyst, Hornblower & Weeks

Consistent growth achieved by Eastman Kodak Company in recent years traces as much as anything to outstanding progress in chemical research. Eastman long has been recognized as a leader in photographic supplies, but the company seldom is mentioned as an important factor in cellulose products, plastics and chemicals. Shipments in these items, however, are expected to approximate $200 million this year, or almost one-quarter of estimated sales of $800 million or more—a sizable volume in chemical lines.

Eastman is expanding its production of Tenite polyethylene and has more than doubled capacity at its Texas facilities. At its Kingsport, Tenn. plants, Eastman has become one of the major sources of acetate fibers used by many cigarette manufacturers for filter tips —another rapidly expanding market for expendable materials.

Sales of acetate and chemicals have more than kept pace with growth attained in photographic shipments. For example, cellulose products, which accounted for 15 percent of Eastman's total volume of $633.5 million in 1954, contributed about 17 percent of larger totals in 1955 as well as again last year. Likewise, chemicals such as alcohol registered an increase from 6 percent of the 1954 total to 7 percent in 1955 and the same ratio for 1956. Indications are that wider gains will be reported for 1957.

Eastman has proved one of the outstanding growth industrials of the century. Available records indicate that for each share of common stock issued at the time of incorporation in 1901 there were outstanding at the directors' November dividend meeting slightly more than 84 shares. At the 1957 high market quotation a block of 84 would have been worth



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Flexbond 800	Copolymer	51-53%	9.0	550-850 cps	0.7 microns	The proven workhorse of the FLEXBOND series of resins for paint. A high molecular weight polymer, it combines excellent water resistance and resistance to discoloration on baking with unsurpassed flow and leveling properties. Recommended for primer sealers, interior flats, exterior paints and industrial finishes.
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Vinac WR-50	Homopolymer					A fine particle size homopolymer which forms films at room temperature and requires less plasticizer than most homopolymers to obtain equivalent flexibility. Recommended for fire retardant paints.

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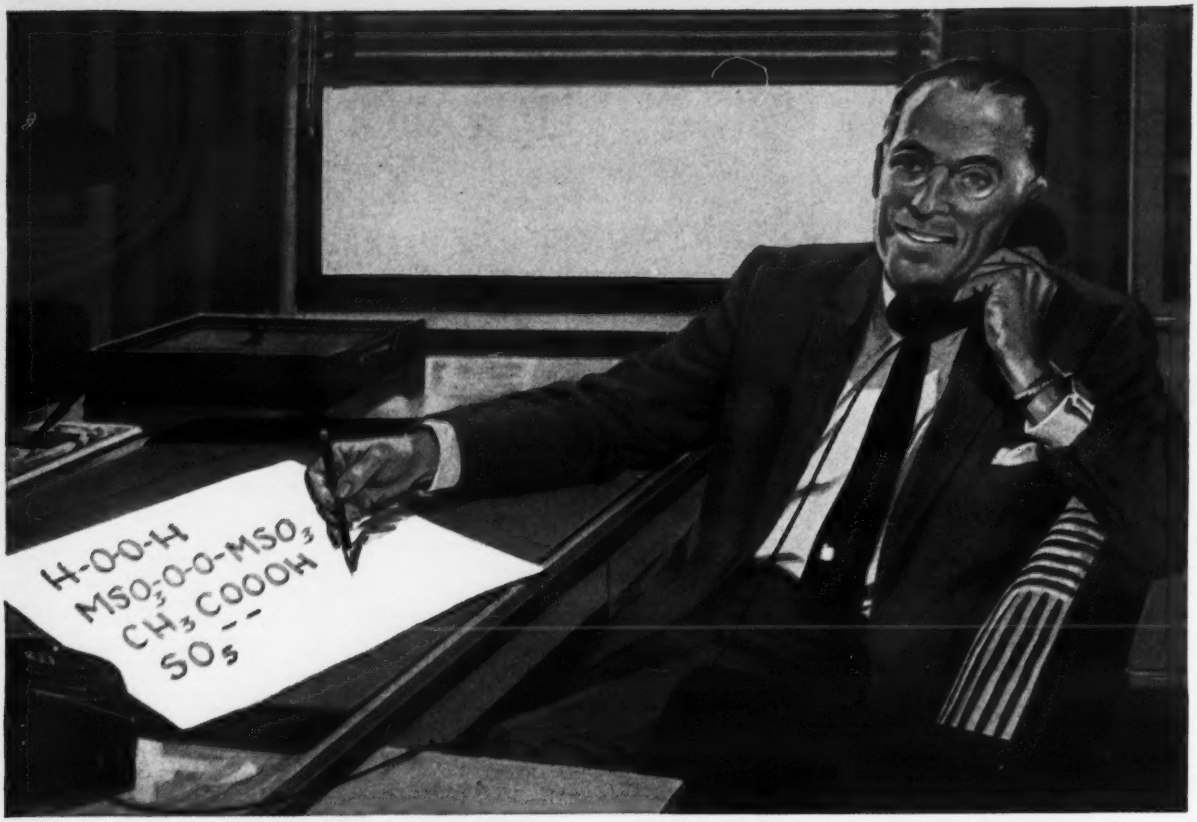

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Check 2943 opposite last page.

about $9,700, indicating the extent to which an original share of stock might have appreciated in value if held for more than 50 years.

Management has followed closely the policies laid down by the company's founder, George Eastman, who advocated ploughing back into the business a large share of earnings. Thus, although distributions in cash have been modest, such payments have been supplemented from time to time by stock dividends. Following a 5-for-1 split in 1947, stock dividends of 5 percent have been distributed in 1949, 1950, 1953, and 1957 and payments of 10 percent were disbursed in 1951 and 1952.

Capital expenditures made possible by depreciation as well as by retained profits for the seven years beginning in 1950 totaled sligthly more than $400 million. Including 1957 reinvestments, estimated at more than $80 million, funds channeled into expansion as well as modernization of facilities and into product development have approached $500 million in eight years. This would amount to more than $25 a common share. In addition, working capital has increased by about $156 million or more than $8 a share.

Book value of the common stock, increasing steadily from year to year, has almost doubled in the last decade. The figure stood at $14.18 a share at the end of 1947 and by December 31, 1956, had advanced to $27.88. The company has no funded debt. Non-callable preferred stock, selling on the New York Exchange recently to return about 4 percent on the $6 dividend, is outstanding in the amount of $6,165,700.

For further investment information on Eastman Kodak write Hornblower & Weeks, 40 Wall Street, New York 5, N. Y., or check 2944 on form opposite last page.

Spotlight on people

Executive moves at Carbide make **D. B. Benedict** vice president for corporation. **E. E. Fogle** takes over Benedict's former position as president of Union Carbide Chemicals Company, while **K. H. Rowland** is appointed vice president-production for the division. **Arthur P. Moss,** former CHEMICAL PROCESSING Editorial Advisory Board member, is new division works manager. And at Carbide's newly formed Union Carbide Olefins Company . . . **H. D. Kinsey** is made president, while **R. N. Graham** and **W. F. Reich Jr.** become executive v-p's. **N. C. Bacock, L. J. Bowditch, G. T. Felbeck,** and **E. P. Shetter** are named v-p's for the new division.

Dr. John R. Brown Jr. is elected director and vice president in charge of research and development for Colgate-Palmolive Company.

Board of directors at Allied Chemical elects **Kerby H. Fisk** chairman of the board. Allied also announces the retirement of **Mark M. Biddison,** former president of General Chemical division.

Personnel changes at American Cyanamid's Organic Chemicals Division make **Hugh Puckett** director of sales and **R. W. Daniels** assistant director of sales. **J. G. Affleck** is appointed manager and **R. W. McCullough** is named sales manager for division's rubber chemicals department. And in the division's intermediates department, **T. E. Hazell Jr.** is moved up to post of sales manager. Also at Cyanamid . . . **James F. Allen** becomes manager of refinery chemicals department in the Industrial Chemicals division

Puckett

US Rubber elects **John W. McGovern** president. McGovern succeeds **H. E. Humphrey's Jr.,** who will continue with company as chairman of board and chief executive officer.

McGovern

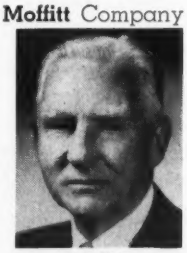
Joseph J. Swigart, general manager of Vitro Rare Metals Company, a division of Vitro Corporation of America, is named vice president of Berkshire Chemicals, Vitro's chemical sales subsidiary.

Norman P. Phillips is promoted to position of manager of sales development for General Tire & Rubber's chemical division.

Hooker Electrochemical elects **Thomas E. Moffitt** Company president. Moffitt succeeds **Bjarne Klaussen** who will continue as a director.

A. K. May joins Antara Chemicals, sales division of General Aniline & Film, as manager of ethylene chemical sales.

Frederick A. Gilbert is named president of the Westvaco Chlor-Alkali Division of Food Machinery. Gilbert will continue as president of FMC's Becco Chemical Division.



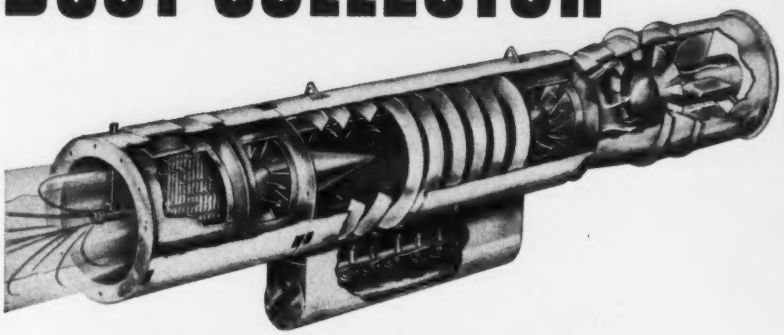
Moffitt

Russell F. Erickson is elected executive v-p of Rayonier Incorporated.

Andrew J. Schroeder II is named director of Scott Paper and is appointed to fill newly created post of administrative vice president.

American Cyanamid appoints **A. J. Weith Jr.** commercial development manager for the Organic Chemicals Division.

NEW PROVED JOY-MICRODYNE DUST COLLECTOR

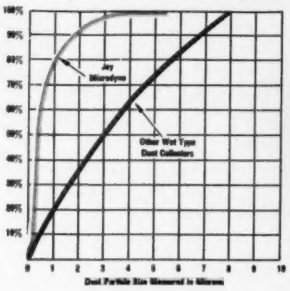


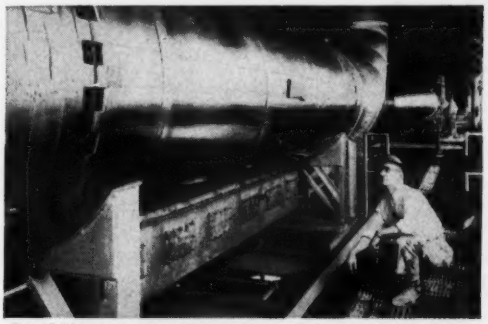
PROFILE OF A PROBLEM SOLVER

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.

Performance graph of actual installation shows efficiency of the Joy Microdyne Dust Collector. (A micron is 1/25,000 inch)





This 48,000 cfm installation shows space economy of in-duct placement.

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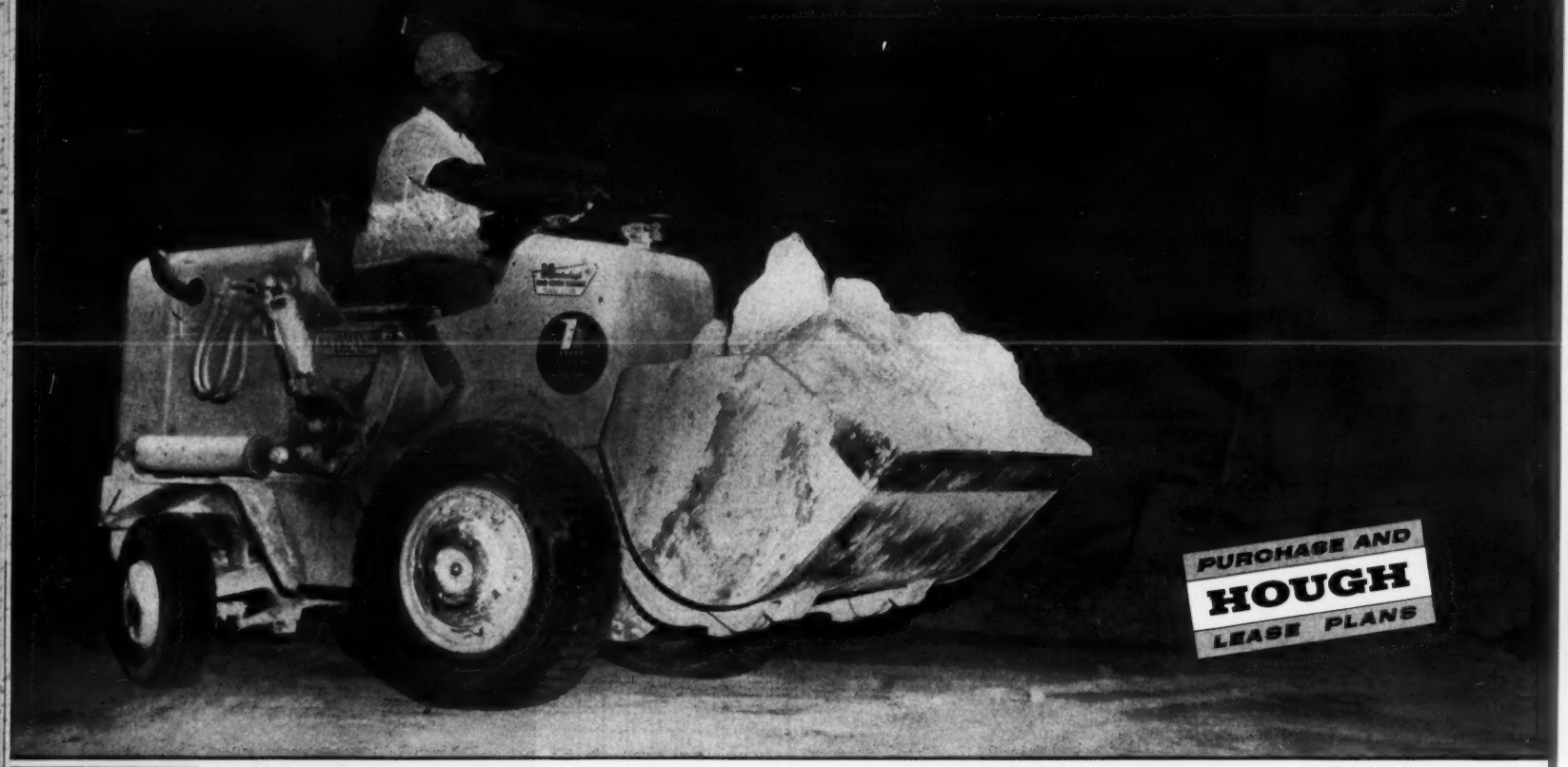
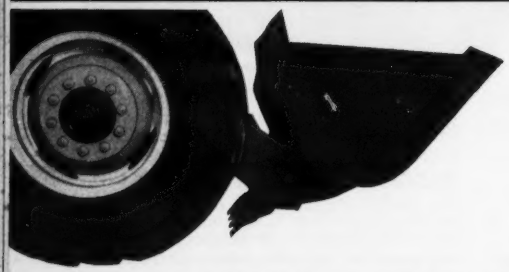
"...more production... less operator fatigue... lower maintenance"





RIP UP PACKED FERTILIZER

Scarifier teeth attachments are now available for HA and HAH "PAYLOADER" models — quickly loosen packed fertilizer from runways and floors by reverse "PAYLOADER" travel. Hinge-mounted on the boom — easily removed when not needed.

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

Send PAYLOADER information on:

- ☐ HA (2,000 lb. carry) and HAH (3,000 lb. carry)
- ☐ Scarifiers for HA and HAH
- ☐ Larger models (up to 9,000 lb. carry cap.)

Name.....

Title.....

Company.....

Street.....

Meridian Fertilizer Factory, Hattiesburg, Miss. has 5 model HA and 3 larger HAH "PAYLOADER" tractor-shovels. Speaking of the new style model HA the plant superintendent, William H. Field says, "Roll-back, breakout bucket action and torque converter drive is an ideal combination. Production increased 30% along with lower maintenance and less tire wear and less operator fatigue. We have been using Hough equipment 11 years."

Plant after plant like Meridian testify that they get more and better performance from "PAYLOADER" tractor-shovels. They tell us that roll-back bucket action, hydraulic-load-shock-absorber, break out digging action and the many other "PAYLOADER" features all add up to increased production, lower maintenance and greater safety.

If you have an older model HA or model HAH "PAYLOADER" or any other tractor-shovel in their size ranges, it will pay you to see how much more these new style units can produce. Your Hough Distributor would like to show you. Contact him today, and ask about Hough Purchase and Lease Plans too.

PAYLOADER®
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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Check 2946 opposite last page

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From page 49

cation, and Welfare, which would issue a new order. The Government has always had the opportunity of consulting the National Academy of Sciences. It proposes that industry have the same opportunity if it wishes.

The basic principles that the Department of Health, Education, and Welfare supports in considering food additives are:

1—The intended use of an additive in a food should be shown to be safe from the standpoint of long-term as well as short-term consumption before it is tolerated.

2—The use of a poisonous or deleterious additive should serve a purpose beneficial to the consumer and the manufacturer. The purposeless addition of poisons to food should not be permitted.

3—Evidence to establish the above points should be secured by the person who wishes to promote use of the additive and should be submitted to the Government for evaluation. The proposed use should be permitted by the Government only after a favorable decision by competent scientists.

4—There should be adequate provision for appeal of an adverse Government decision to the courts according to procedures that permit full consideration of complex scientific questions by scientists. New, untried appeal procedures should not be experimented with in this field of public health protection.

5—Any additive already in use, whose safety is not generally recognized, should be tested to establish its safety. There should be a reasonable period of time after the new law goes into effect to permit such testing ■

For more information on product at left, specify 2947 . . . see information request blank opposite last page.

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...you can improve operating efficiencies, cut costs and increase product quality with...

HIGH PURITY 99.0+% MAGNESIUM OXIDE

International MgO may offer you unexpected advantages as a replacement for other material or for a new application. It has unusual versatility in performance characteristics—and is produced in the highest purities ever available in carload quantities and in the low price range. Our research staff offers you technical assistance on end use problems and in the application of MgO to your production processes.

price range

International MgO prices range from $110 to $250 per ton, F.O.B. Carlsbad, depending on grade, packaging and quantity.

INTERNATIONAL MgO HAS DEMONSTRATED ITS SUPERIORITIES FOR THESE AND OTHER USES

- *As an alkali precipitant.*
- *As a compounding agent in rubber formulations.*
- *As a furnace feed for special fused refractories.*
- *In the manufacture of high purity magnesium compounds.*
- *For blending with other magnesias.*

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

POTASH DIVISION ..... 20 N. Wacker Drive, Chicago 6

485 LEXINGTON AVE., NEW YORK 17 · MIDLAND, TEXAS · FULTON NATIONAL BANK BLDG., ATLANTA, GA.

physical specifications
(Color . . . White)

PELLETS: Approx. 1/8" x 3/16", plus 12 mesh
Bulk density: 60 lb. cu. ft.

GRANULAR: All minus 12 mesh
Bulk density: 70 lb. cu. ft.

POWDERED: 100% minus 200 mesh
90% + minus 325 mesh
Bulk density: 80 lb. cu. ft.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION
20 North Wacker Drive, Chicago 6

☐ Please send me samples of MgO in ..... form
(pellet—granular—powdered)

☐ Please send Magnesium Oxide Brochure
My field of interest for MgO is .....

Name .....

Firm .....

Address .....

City ..... State .....

Check 2948 opposite last page.

Here is an example of the trend toward greater use of aluminum in refineries, chemical plants, and petrochemical plants. It's proving to be economical in the long run because it offers excellent protection against weather and corrosives . . . while maintaining its "fresh" appearance with a minimum of cleaning or other maintenance.

Refinery keeps 'JUST NEW' look with aluminum

GORDON WEYERMULLER
Associate Editor

The attractive appearance of aluminum — at one of the most striking refineries in the world — is well illustrated by accompanying photographs showing some of the equipment where aluminum is used as exterior surfacing, at the Lake Charles plant of Cities Service. For the applications shown here, and a number of others, aluminum was chosen for its favorable appearance and ease of keeping it "looking like new." Corrosion-resistance of the metal in an industrial atmosphere is another factor, of course, which caused it to be selected for a variety of applications in the plant.

These advantages, plus economic considerations, are governing factors in the trend toward greater use of aluminum in petroleum refineries, chemical plants, and petro-chemical

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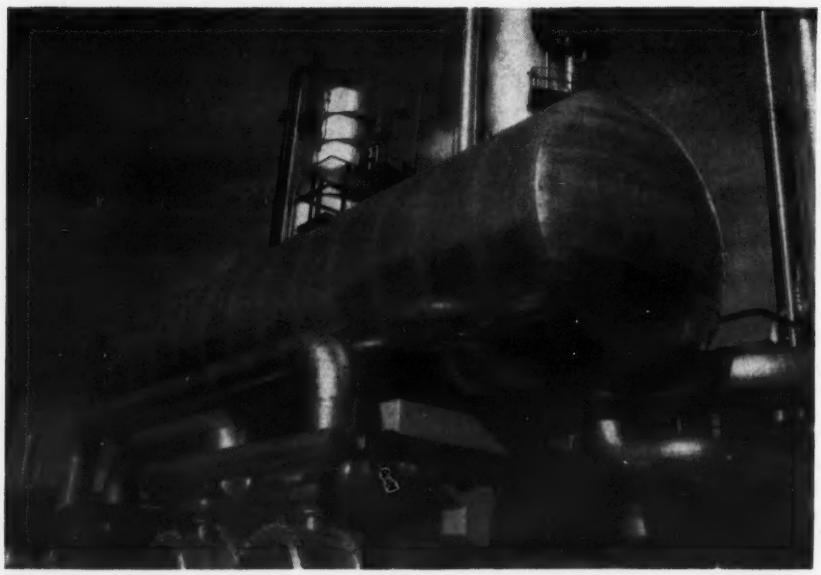
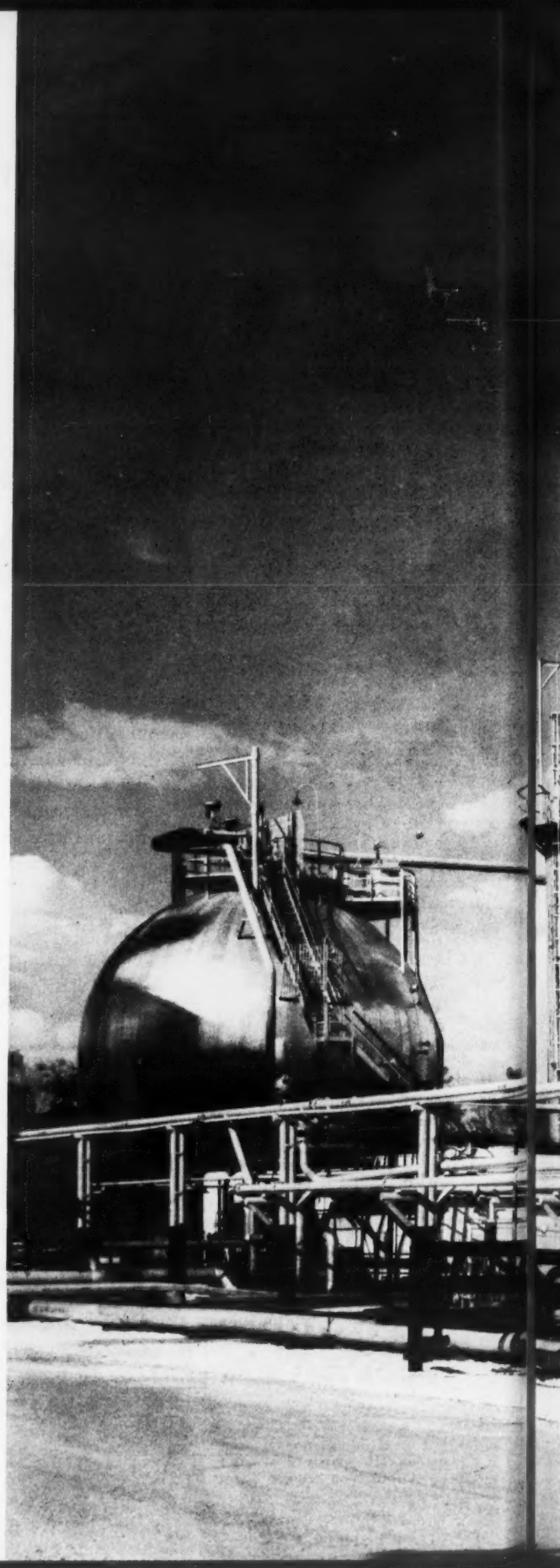
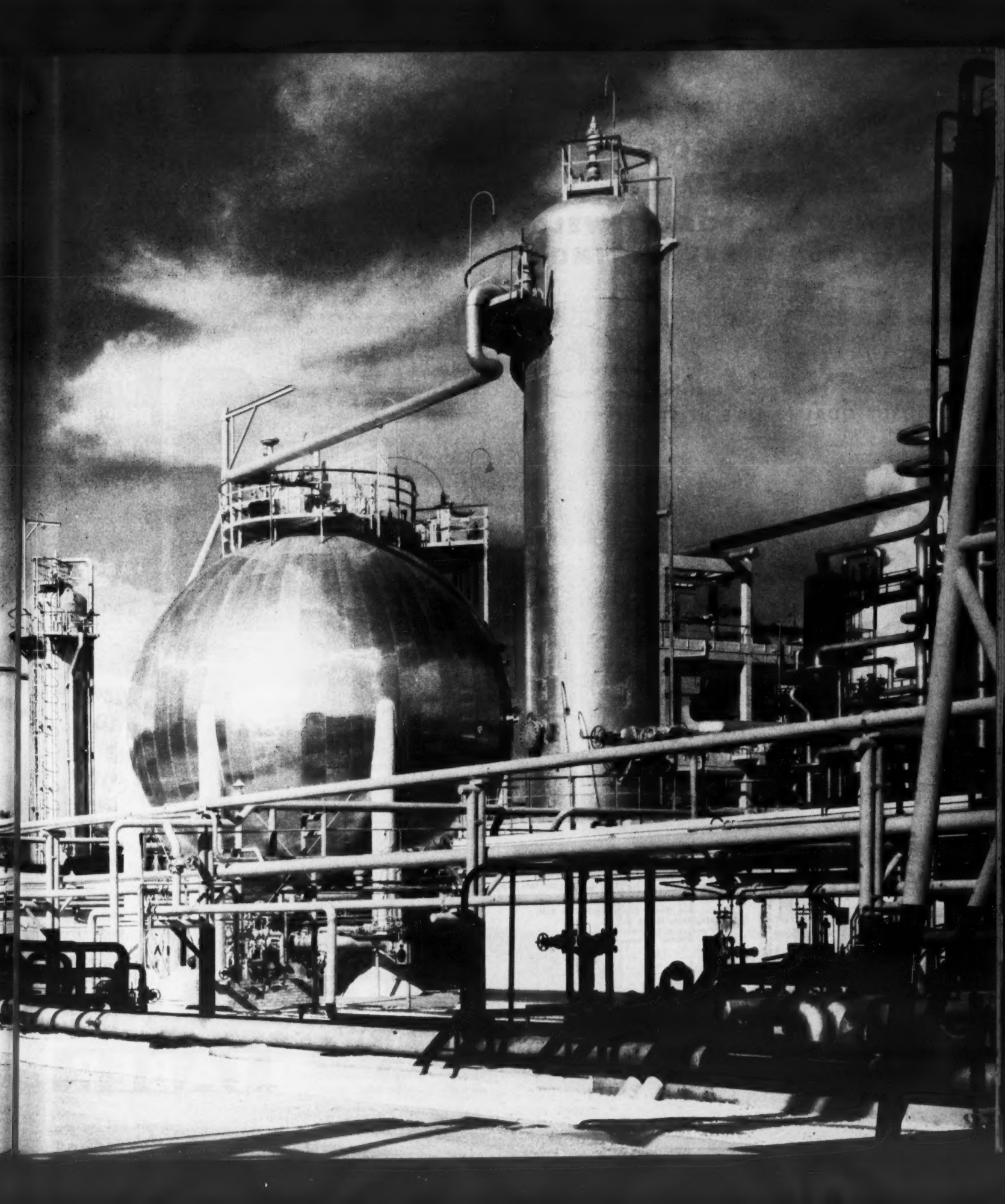


If aluminum is stained during a turnaround it can be easily cleaned



Aluminum at Cities Service still glistens like new after several years service



plants throughout the country.

In both photos shown here, aluminum serves as a waterproof jacket to protect insulation on spheres, tanks, towers, and piping. Insulation, which consists of 85% magnesia in block form, is 1½" thick. Although the atmosphere in the area is not severely corrosive, some of the equipment is subjected to gases from heater stacks nearby. (Aluminum was used for jacketing two tanks containing liquid sulfur at the acid plant. This is definitely a corrosive area, and the tanks are giving good service.)

In large photo at right, desalting sphere and surge drum for A Topping Unit are shown in center. Desalting sphere and surge drum for B Topping Unit are at left in this photo. Aluminum on these units, placed in service March 13, 1948, is still in good condition.

In the smaller photo, the column at left, in back of horizontal drum, is a vacuum tower. Remainder of equipment shown is part of feed preparation unit for reformer. Column in center is secondary tower. Horizontal drum in foreground is the primary tower overhead condensate drum. All of this equipment was placed on stream September 7, 1954.

None of the aluminum on these units has been replaced to date. If it is stained during a turnaround, it can be easily cleaned with a commercial cleaner called Liqui-Det. This material is a balanced blend of complex phosphates, solvents, and a combination of surface-active agents. In the working range of ½- to 4-oz per gal (depending on use), it is colorless, practically odorless, and has a pH of 9.5. It is miscible with water in all proportions, and works well in either hot or cold solutions. If stains are exceptionally bad, it is necessary to use brushes and steel wool for complete removal.

Specific cost figures for the aluminum jacketing in use at Cities Service are not given since changes have occurred in labor and material

To page 70

WHEN SPECIFICATIONS REQUIRE

2000 LB. - 3000 LB. and 6000 LB.

SCREWED and SOCKET WELD STAINLESS STEEL FITTINGS

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CAMCO

"THE QUALITY LINE IN STAINLESS"

CAMCO Extra Heavy Fittings are machined from solid drop forgings and are recommended for use where severe pressure-temperature conditions are encountered. Materials conform to ASTM-A-182 where applicable. Dimensions conform to SP-49-1956 edition for screwed fittings except SP-50-1956 for hex plugs and bushings.

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Also available — 150 lb. screwed fittings, MSS and ASA flanges and all schedules of buttweld fittings.

CAMCO Products, Inc., 445 State St. North Haven, Conn.

- ☐ Please send Flange Dimensional Slide Rule.
- ☐ Catalog Extra Heavy 657.
- ☐ Catalogs covering complete line.
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THE Quality LINE IN STAINLESS

CAMCO PRODUCTS, INC.

445 STATE STREET NORTH HAVEN, CONN.

Check 2949 opposite last page.

BASIC FACTS . . .

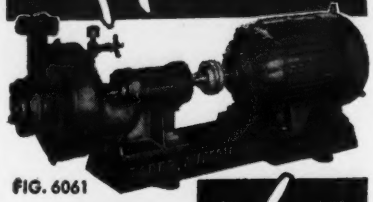


FIG. 6061

Fig. 19,488

for DECIDING ON TYPE OF PUMP; *Write for* TABER BULLETIN S-146

Practical GUIDE TO PUMP SELECTION

Big illustrations and brief descriptions with capacities and adaptability of pumps are contained in this unbiased compilation of facts to help avoid costly mis-application. Bulletin S-146.

TABER PUMP CO.
Est. 1859
320 Elm St.,
Buffalo 3,
N. Y.

K-777

TABER

Check 2950 opposite last page.

PETROCHEMICALS SECTION

—will be starting in next month's CHEMICAL PROCESSING and will carry news on the booming worldwide petrochemical industry.

Designed for Management

Section will be especially designed to meet the needs of petrochemical management.

It will probe the meaning of petrochemical developments here and abroad. Engineering-type articles telling how costs can be cut, labor saved, or products improved will be carried.

Material on petrochemical processes will be featured.

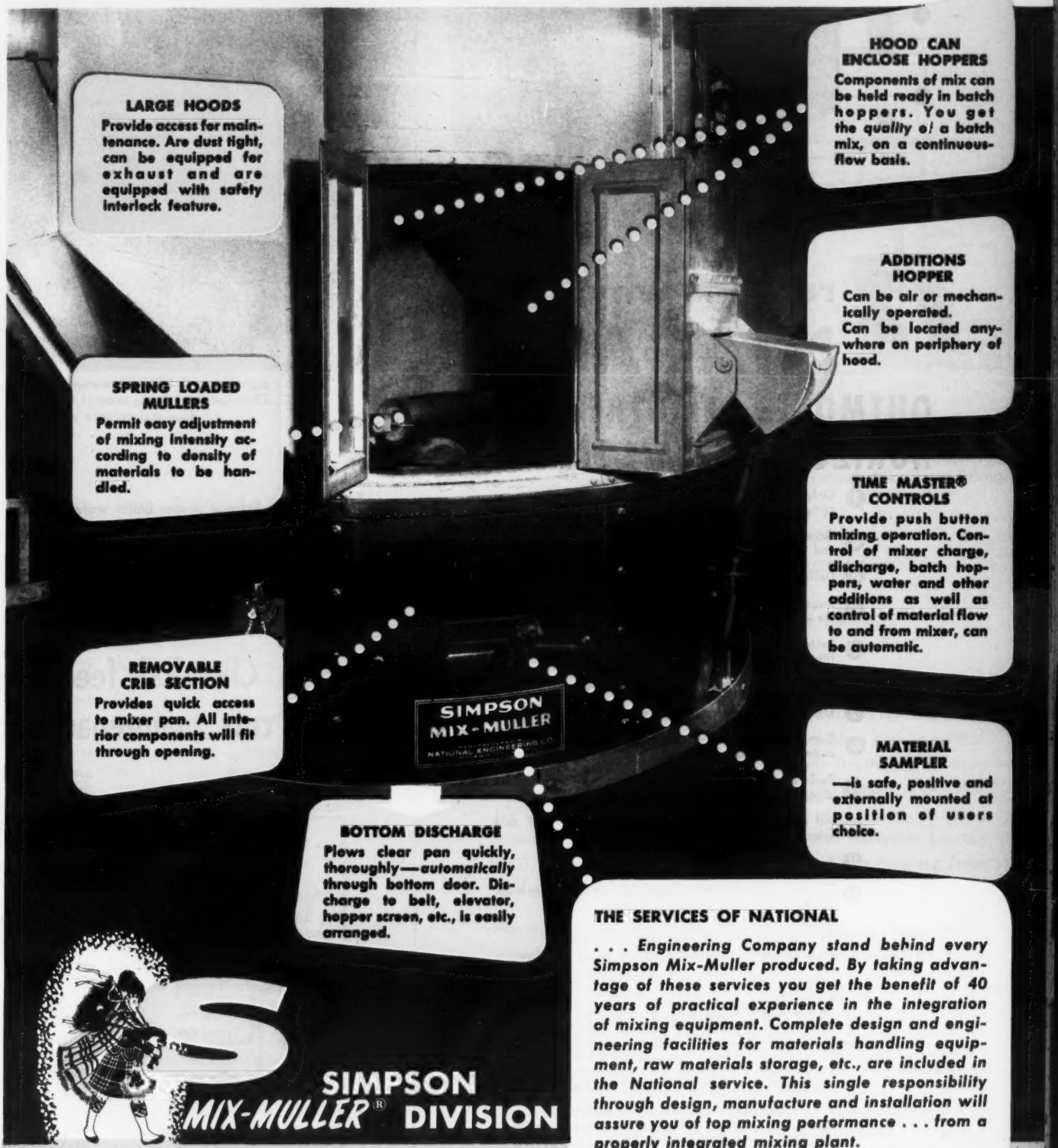
Reports study on petrochemicals

February issue will lead off with results of a study CHEMICAL PROCESSING made in cooperation with a number of petrochemical leaders.

Report indicates petrochemical industry will top growth rate for either petroleum refining or chemical industry.

For more information on product at right, specify 2951 see information request blank opposite last page.

Why Engineers prefer Simpson MIX-MULLER®



LARGE HOODS
Provide access for maintenance. Are dust tight, can be equipped for exhaust and are equipped with safety interlock feature.

SPRING LOADED MULLERS
Permit easy adjustment of mixing intensity according to density of materials to be handled.

REMOVABLE CRIB SECTION
Provides quick access to mixer pan. All interior components will fit through opening.

BOTTOM DISCHARGE
Plows clear pan quickly, thoroughly—*automatically* through bottom door. Discharge to belt, elevator, hopper screen, etc., is easily arranged.

HOOD CAN ENCLOSE HOPPERS
Components of mix can be held ready in batch hoppers. You get the *quality* of a batch mix, on a continuous-flow basis.

ADDITIONS HOPPER
Can be air or mechanically operated. Can be located anywhere on periphery of hood.

TIME MASTER® CONTROLS
Provide push button mixing operation. Control of mixer charge, discharge, batch hoppers, water and other additions as well as control of material flow to and from mixer, can be automatic.

MATERIAL SAMPLER
—is safe, positive and externally mounted at position of users choice.

THE SERVICES OF NATIONAL

. . . Engineering Company stand behind every Simpson Mix-Muller produced. By taking advantage of these services you get the benefit of 40 years of practical experience in the integration of mixing equipment. Complete design and engineering facilities for materials handling equipment, raw materials storage, etc., are included in the National service. This single responsibility through design, manufacture and installation will assure you of top mixing performance . . . from a properly integrated mixing plant.

Write for the new bulletin on mulling.

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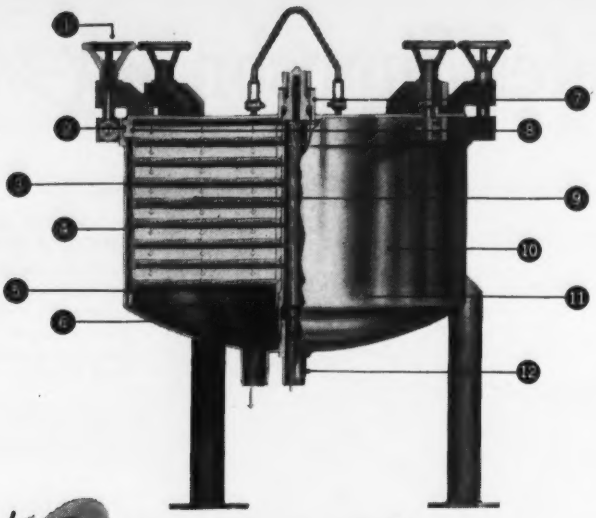


12 reasons why: NIAGARA OUTMODES ALL OTHER HORIZONTAL PLATE FILTERS

1. Only a few handwheels and eyebolts and one central compression nut seal entire stack.
2. Adjustable O-ring cover gasket provides perfect seal and adapts to different thickness filter media.
3. Uniform feed distribution through plate hubs.
4. Rugged die formed plates will withstand years of hard use — no delicately machined surfaces.
5. Bottom plate reinforced to withstand full differential filtration pressure.
6. Always a clean tank — solids never reach tank.
7. Center compression ring seals plates at center.
8. Compression ring integral with cover seals plates *uniformly* around periphery.
9. Perforated plate or wire screen drainage member for exceptionally high flow rates.
10. All units are ASME CODE constructed for a 75 psig internal pressure.
11. Tank is not normally under any pressure.
12. Central inlet eliminates need for separate scavenger plate.

Get complete details — send for bulletin on Niagara "Batch-Miser" horizontal plate filters today.

Niagara FILTERS

A DIVISION OF

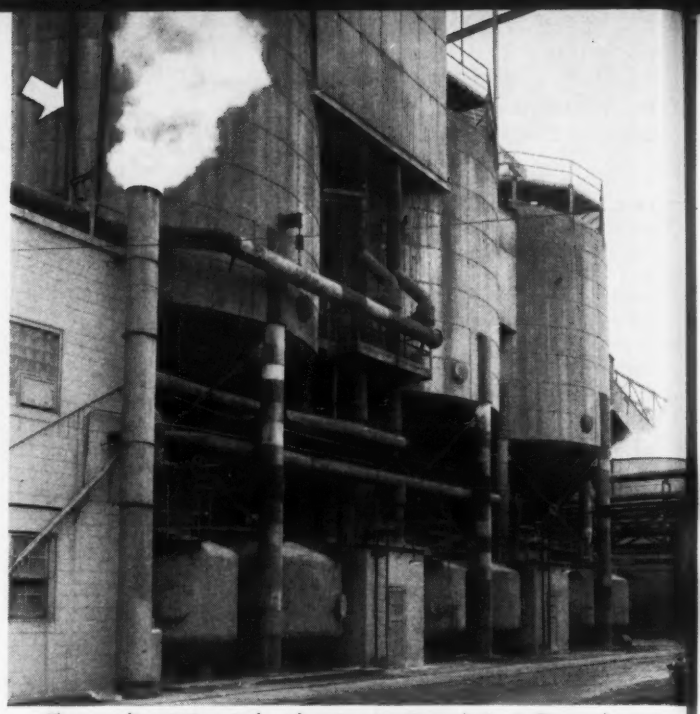
American Machine and Metals, Inc.

Dept. CP-158, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

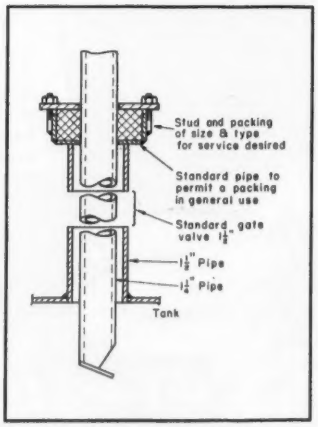
Check 2952 opposite last page.



Three sedimentation tanks of water treating plant at Diamond Alkali. Chemical feed lines, seen at left (arrow) have helped reduce maintenance almost 50%

Because proper boiler water treatment requires uniform feeding of chemicals, feed lines had to be kept open — a high maintenance item at Diamond Alkali. Company engineers designed a hose-"lance" combination for a . . .

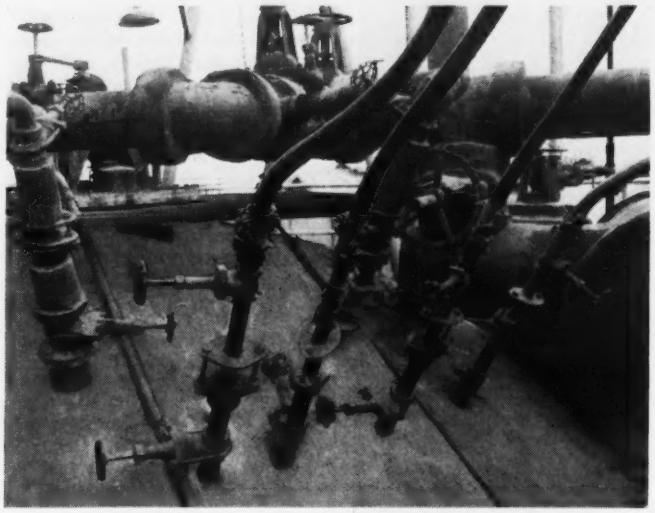
Chemical feed system that cuts maintenance costs 50%


Stud and packing of size & type for service desired
Standard pipe to permit a packing in general use
Standard gate valve 1½"
1½" Pipe
1¼" Pipe
Tank

Introduction lance: Lance is fabricated from standard materials, uses standard packing gland

THEODORE W. WETT
Assistant Editor
with **TOM R. DAY, JR.**
Asst. Superintendent of Utilities
Diamond Alkali Company
Painesville, Ohio

Problem: Plugging of chemical feed lines and introduction points was a major operational difficulty in Diamond Alkali's Painesville, Ohio, boiler water treatment system. Raw water is treated by a hot lime-soda-phosphate softener for use in a 2200-psi pressure boiler. Rated capacity of system is 1.5 million pounds of treated water per hour. It is operated



Hose-lance introduction points at top of sedimentation tank. Lances can be removed while tank is under pressure in case of plug-up

under 5 psi steam pressure, giving an average operating temperature of 225°F.

Treating chemicals — lime, soda ash, caustic, sodium aluminate, and disodium phosphate — are mixed separately to a predetermined strength in mixing tanks. Each time a given amount of water is metered into sedimentation tank the appropriate amount of each chemical is fed to it from mixing tank.

When feed lines plugged, it was a tedious and time consuming job to mechanically clean closed section. Water purity suffered since treatment chemical must be added at a uniform rate for proper coagulation. Also, as plant size increased, it was common to find line on which it was necessary to work in most inaccessible place.

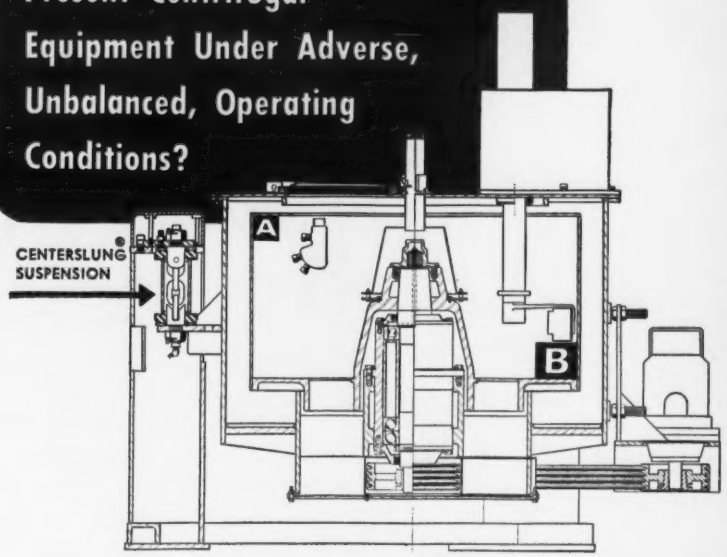
Solution: In 1953, Diamond Alkali engineers devised a system of hose and "lance" for introduction of treatment chemicals. Hoses are two-braid rayon cord, neoprene covered, in standard 50-ft lengths, 1½" in diameter.

Side-entering points were discontinued and all chemical feed lines brought to top of tank and arranged so that spray was within path of agitator. "Lance" for actual injection of feed slurry consists of a 1¼" pipe which enters tank through a 1½" gate valve and pipe. Standard packing gland permits lance to be inserted or removed while tank is under pressure. Lance end is shaped to give desired spray or distribution.

Results: Combined system has provided a reduction of nearly 50% in maintenance and repair costs. Extreme flexibility of system permits ease of switching lines and introduction points in case of trouble or routine maintenance and cleaning. Extra hoses are provided and in case of plug-up a line can be replaced quickly. Chemical cleaning of plugged line is then possible without any delay in water treatment. Spare pumping equipment can be used whenever necessary without complicated interconnection or large number of valves.

Diamond Alkali feels that system has given required flexibility necessary for chemical feeding. Combined with a program of routine cleaning, it has improved water quality, reduced number of emergency repairs, and kept cost of maintenance at a minimum. ■

How Stable Is Your Present Centrifugal Equipment Under Adverse, Unbalanced, Operating Conditions?



Section of new Tolhurst Batch-O-Matic® combining for the *first time* Centerslung® suspension with bottom discharge, PLUS fully timer-controlled automatic batch programming.

Will your centrifugal equipment operate safely —

A WITH A DYNAMIC OUT-OF-BALANCE LOAD?
(Up to 5 lbs. out of balance at "A")

B WITH A STATIC OUT-OF-BALANCE LOAD?
(Up to 20 lbs. out of balance at "B")

The new Tolhurst Batch-O-Matic Centrifugal passed these tests with no appreciable vibration being transmitted to the foundation — only a smooth oscillation on a horizontal plane and no vertical jumping. That's real assurance of Tolhurst's stability in handling all materials, free or slow-draining, even the toughest jobs. This big operating advantage is provided by exclusive Centerslung mounting — the highly stable suspension that minimizes bearing wear, downtime and other maintenance problems resulting from excessive vibration.

For help in connection with your centrifuging problems, call in your nearest Tolhurst representative. (He is listed in Chemical Engineering Catalog.) Or, write us direct.

Tolhurst CENTRIFUGALS
A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation
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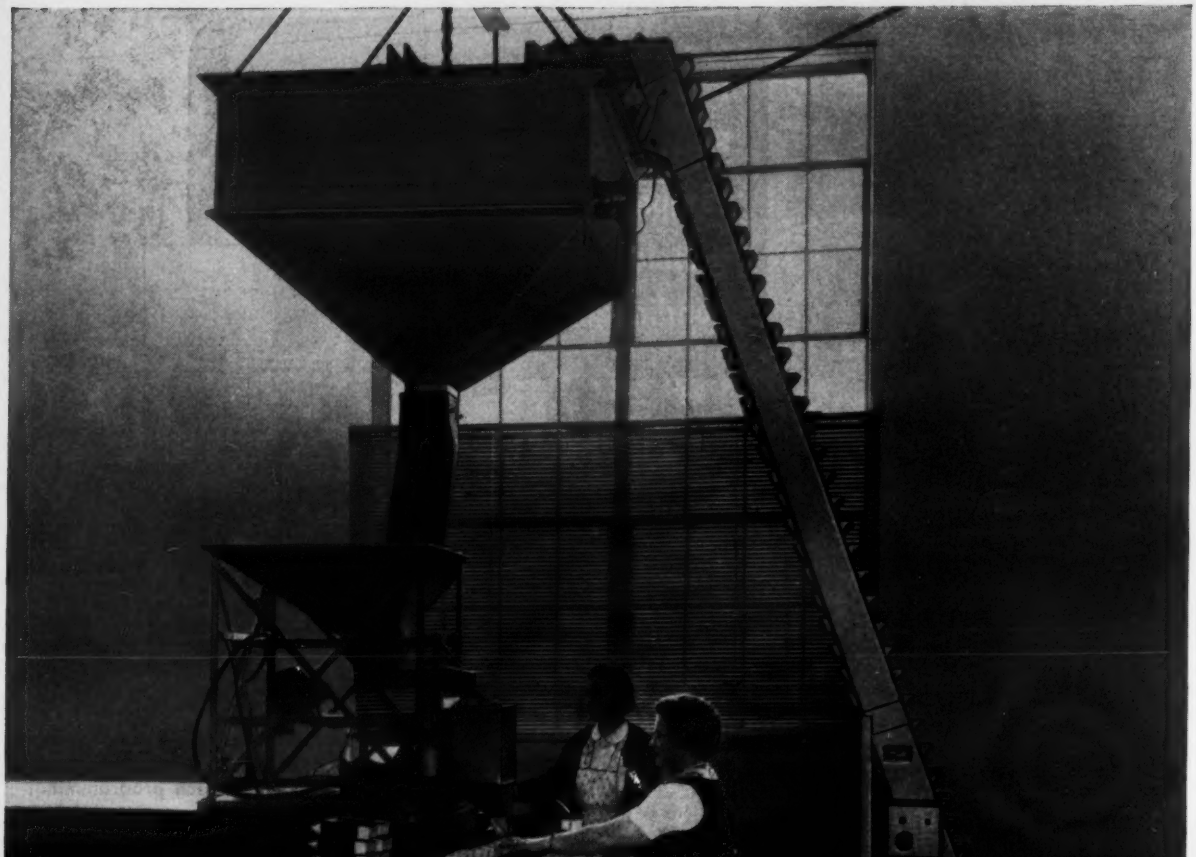
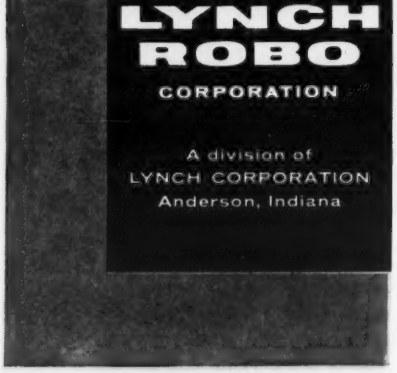
Check 2953 opposite last page.



ROBO-LIFT MOVES MATERIALS UP-AND-OVER AT LESS COST!

Wherever bulk materials must travel up from one processing step and over to the next, it will pay you to consider the Lynch Robo-Lift. It saves time, manpower, and money because it does the entire job *automatically,* with no costly rehandling. Robo-Lift's clean, gentle, filling-without-scooping action handles food, drugs, chemicals, hardware (and just about everything!). It can't crush or contaminate materials, will not spill them, will not leak. Each installation is custom-designed to work with existing processing and packaging equipment. New folder "Up and Over" gives full facts. Write for it today.

ROBO-LIFT BUCKET ELEVATING CONVEYORS



Check 2954 opposite last page.

NEW SOLUTIONS

Aluminum in Refinery

From page 66

since installations were made.

Costs for labor and for material are usually about equal. When all factors are carefully considered, it seems certain that the aluminum used was well justified.

(For further information on aluminum for the process industries, contact Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.)

Check 2955 opposite last page.

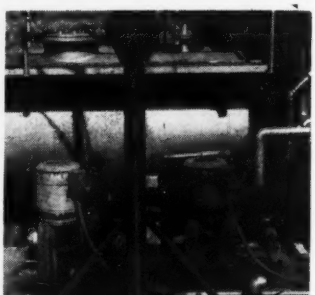
(Liqui-Det cleaner is manufactured by Oakite Products, Inc., 19 Rector Street, New York 6, N. Y.)

Check 2956 opposite last page.

Molten sulfur service not too tough for sump pumps

Units handle heated material at 280 to 320°F

Problem: In Maurer process for producing carbon bisulfide, molten sulfur (280-320°F) is reacted with charcoal. Sulfur is melted in a



Pumps handle sulfur at 280-320°F

six-foot sump and pumped from there to a variable-speed feeder which introduces it into refractory-lined furnace.

Process is efficient, producing a metric ton of CS_2 using only 850 kw of electric power. However, to maintain efficiency, molten sulfur fed from melt sump has to be uninterrupted and dependable.

Solution: In Sept. 1956, two

To page 72

PROCESS PIPING POINTERS

Maximum security a must for chlorine

Minimize its hazards—cut piping costs, too—by handling chlorine (gas or liquid) with steel valves designed specially for this noxious fluid. Fitted with Hastelloy "C" seat and disc, and Monel stem, they give corrosion a tough time. Teflon stem packing and bolted, gasketed bonnet joint eliminate any leakage. Such valves are available in globe or angle patterns, screwed or flanged ends. For literature, see below. Also see next page.

Extended bonnet valves for extremely low temperatures

These special bronze body globe valves are successfully controlling liquid oxygen and liquid nitrogen down to minus 318 deg. F. Design features extended bonnet with insulation collar, replaceable seat and plug disc — all of stainless steel. Bonnet can be insulated up to collar. Stuffing box is above cold zone; assures easy, dependable operation. Made for 150- and 300-pound pressure ranges, with flanged, screwed or solder ends. See below for more information.

"Aids to Selection of Corrosion-Resisting Piping Materials"

You'll combat corrosion more effectively with this 12-page technical paper at hand. It discusses questions on important related service factors that aren't always obvious . . . shows with colored "stop, caution and go" charts the suitability of metals for more than 150 corrosive fluids, based on extensive tests and experience. Ask for publication AD-1703R.

Copper-free Ni-Resist valves now regularly available

To accommodate preference of users, Crane is now using copper-free Ni-Resist (Type 2) for regular production of these widely used, economical corrosion-resistant cast iron gate valves. Approximate composition is 20% nickel, 2% chromium and 0.5% maximum copper. Body and bonnet of valves are Ni-Resist; trim is stainless steel. Sizes up to 12 inches. Ask for Circular AD-2047R.

For literature or any data on above products, address: J. E. Bradbury, Manager, Chemical Sales Dept.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5

VALVES • FITTINGS • PIPE

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Check 2957 opposite last page.

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processing and engineering **data**

HOW TO MAKE NOMOGRAPHS – V

Multiplication and Division Charts, Parallel and Diagonal Scales

D. S. DAVIS

Head, Department of Pulp and Paper Technology
University of Alabama

Ed. Note — *This is the fifth of six installments in Dr. Davis' series on "How to Make Nomographs." First installment appeared in the August issue. The series was continued in the October issue and will run through February.*

Although multiplication and division is commonly handled by means of parallel, logarithmic scales, another nomograph design that employs parallel, natural scales, connected by a diagonal non-uniform scale, is often advantageous.

Consider the equation

$$F = 0.012\ D\ R$$

which can also be written as

$$0.012D = F/R$$

where, for chlorination of water,

D = chlorine demand, 0 to 10 parts of chlorine per million of water
F = chlorine rate, 0 to 10 pounds per day
R = water rate, 0 to 120 gallons per minute.

Draw two parallel axes at any convenient distance apart. Choose a modulus of 2.5 cm for F and construct the scale 2.5F downward on the F axis as in Figure 5 (page 73). Choose a modulus of 0.2 cm for R and construct the scale 0.2R in the opposite direction on the R axis, centering this scale with respect to the F scale solely for appearance. Connect 0 on the F scale with 0 on the R scale. Choose a point H on the R axis at a convenient distance, say 16, cm from the intersection of the diagonal and R axes.

Along the F axis, construct the temporary auxiliary scale ($16 \times 2.5 \times 0.012 \div 0.2$)D or 2.4D downward from intersection of diagonal and F axes. From point H, project this temporary auxiliary scale to diagonal axis, as shown by dotted line, to obtain permanent D scale. Then erase temporary auxiliary scale and point H. Any straight line will cut R, D, and F scales in values that satisfy the equation.

For a more complete treatment of multiplication and division charts that employ both parallel and diagonal axes, fortified with underlying theory, and extended to cover four variables, see author's "Nomography and Empirical Equations," Chap. 7, Reinhold Publishing Corp., New York, 1955.

Gas or liquid chlorine—these Crane valves hold it safer!

How Hooker cuts costs and hazards of chlorine handling

Take a tip from The Hooker Electrochemical Co. on handling liquid chlorine at low cost. They're doing it with Crane valves especially designed for chlorine. Shown are two of these valves in the loading rack piping at this Tacoma, Washington, plant.

Except for infrequent servicing of the packing, these Crane valves have been entirely free of leakage and maintenance since being installed over four years ago.

What gives Crane chlorine valves this extra performance value?

Each part is designed of materials suitable for the service needs. Carbon steel body has heavy wall sections for safety. Monel stem and Hastelloy "C" seating combination withstand the corrosive effects of chlorine. Narrow bearing 45° taper disc and seat design breaks down hard deposits on seating surfaces, assures positive closure. Teflon stem packing assures tight stuffing box, with easy operation.

If you are handling water-free chlorine gas or liquid in your plant, it will pay you to ask your Crane Representative about the complete line of Crane chlorine valves.

HANDY TO HAVE . . . this folder gives you all the facts and figures on Crane chlorine valves. Get a copy from your Crane man, or write Crane Co.—address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Check 2958 opposite last page.

NEW SOLUTIONS

From page 70

vertical sump pumps (one for service, one for standby) were installed to handle molten sulfur at Industrias Consolidadas de Matanzas, S. A., Matanzas, Cuba. Each delivers 3½ gpm against a total head of 30 ft. Pumps are steam jacketed to maintain sulfur temperature. Liquid-end parts are SS.

Results: Pumps have served well in tough molten sulfur service. Efficiency of carbon bisulfide process has been maintained by dependable performance of units in important sulfur feed application. Use of stainless steel minimizes corrosion.

(Pumps are a product of The Deming Co., 18 Broadway, Salem, Ohio.)

Check 2959 opposite last page.

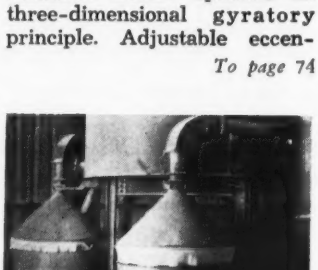
Achieves 98% efficiency in nepheline syenite screening operation

Cloth life on vibrating-screen separators average 2270 hrs

Problem: Oversize particles easily slipped through slotted openings of conventional screen or occurred when screen cloth was worn or damaged in nepheline syenite (alkaline aluminum silicate) screening operation. To meet material size requirements of 98% accuracy, American Nepheline Ltd. of Nephton, Ontario, needed to remove 26 mesh oversize particles in grinding circuit screening.

Solution: Vibrating screen separator of 48" diameter was installed. Device operates on three-dimensional gyratory principle. Adjustable eccen-

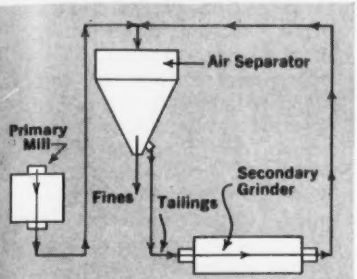
To page 74



Separators handle 7 tons nepheline syenite per hour

STOP OVERWORKING GRINDING MILLS

Boost Production of 40 to 400 Mesh Fines As Much As 300%



STURTEVANT CLOSED CIRCUIT SYSTEM: Primary Mill runs open, load is circulated through air separator. Desired fines are discharged. Oversize recirculates to secondary grinder and then to air separator for further classification.

Current users of Sturtevant Air Separators include manufacturers of sulfur, soybeans, phosphate, chocolate, feldspar, sand, pigments, limestone fillers, abrasives, plasters, ceramics and cement.

Sturtevant Air Separators Can Lower Power Costs Up To 50%

Production capacity impossible in single-pass grinding results from using Sturtevant Air Separators in closed-circuit grinding systems. They are of proved advantage in all secondary reduction processes.

Fines pass through grinding mills unhindered, are classified, and the oversize returns for further grinding. Grinding mills are free to perform at top efficiency, their output frequently increased as much as 300% and power costs cut up to 50% (documented by 30 years of Sturtevant air separation experience in the cement industry).

Precise Classification; Circulates Loads of 800 tph

Sturtevant Air Separators circulate production loads of up to 800 tph. Simple adjustments make possible counter-action between air currents and centrifugal force to the point where a product of almost any desired fineness may be collected while coarser sizes are rejected.

A 16 FT. STURTEVANT, for example, took a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit. (In the cement industry, Sturtevant units deliver up to 60 tph raw cement fines, 40 tph finished cement fines.)

Nine models available, diameters from 3 to 18 ft. For more information, request Bulletin No. 087. (Bulletins also available on Micronizers, Blenders, Crushers, Grinders.) Write STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 2960 opposite last page.

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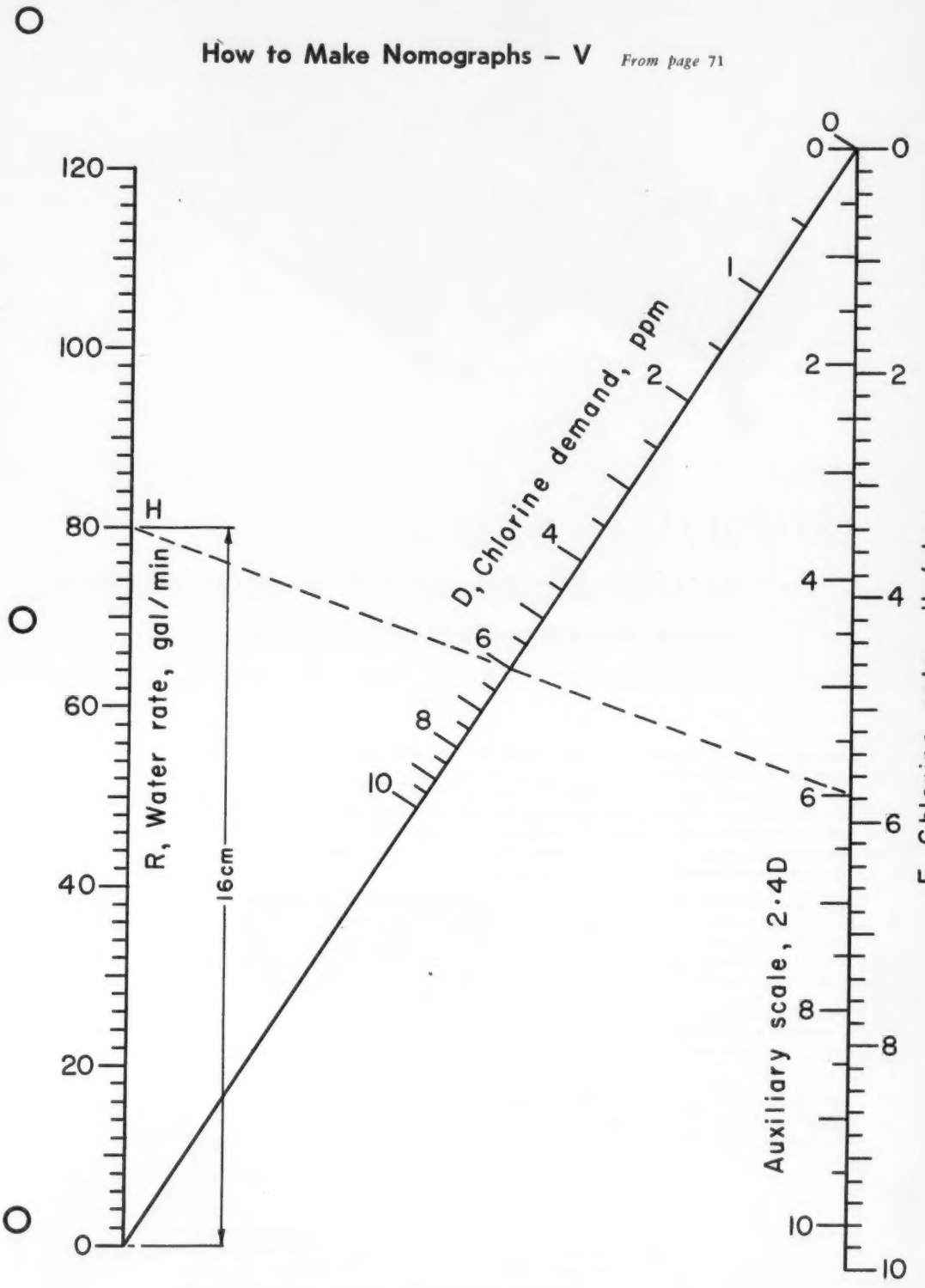
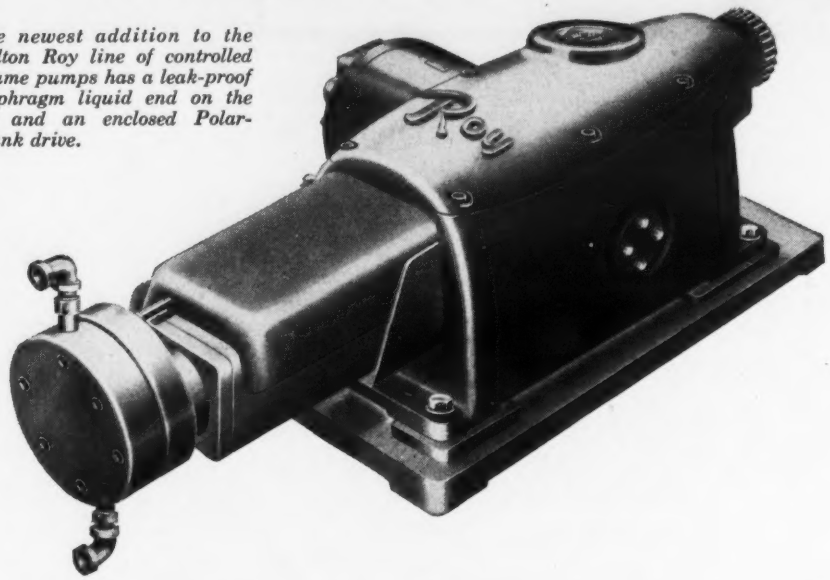
How to Make Nomographs – V

From page 71



The newest addition to the Milton Roy line of controlled volume pumps has a leak-proof diaphragm liquid end on the left and an enclosed Polar-Crank drive.



INTRODUCING!

Milton Roy's Diaphragm Pump and Polar-Crank Drive

Custom built for chemical process industries, the new Milton Roy Controlled Volume Diaphragm Pump will meter liquids accurately against pressures to 2,000 psi and at rates to 400 gph. To prevent leakage, diaphragms separate the displacement chamber and the reciprocating plunger. Because of this leakproof feature, this pump provides maximum flexibility in metering toxic or other chemicals such as mercaptans.

This latest Milton Roy Pump is available with the new Polar-Crank drive, which permits adjustment of the stroke for 0 to 100% capacity changes while the pump is actually metering chemicals. A totally-enclosed unit, this drive is easily coupled with flow-rate indicating, recording or totalizing instruments.

Diaphragm liquid ends are also available on Milton Roy Company's established line of motor-driven controlled volume pumps with screw adjustment of stroke length.

Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa. *Engineering Representatives throughout the world.*

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers

Check 2961 opposite last page.

NEW SOLUTIONS

From page 72

tric weights on bottom of special motor create vibratory motion.

When material is fed onto center of top screen, pattern of flow develops to screen undersize fines through predetermined mesh screen cloth. Oversize material, retained on screen, travels across top screen to discharge spout. From 2 to 5 graduations of dry material may be obtained, using 1 to 4 deck separator.

Results: Efficiency of separation, considering both undersize and oversize material, has been within 98%. Screen life has averaged 2270 hours representing throughput of 8850 tons. Feed rate to each unit averages 4 tons per hour, and has gone as high as 7 tons per hour. Problem of screen cloth blinding during continuous operation has not been encountered.

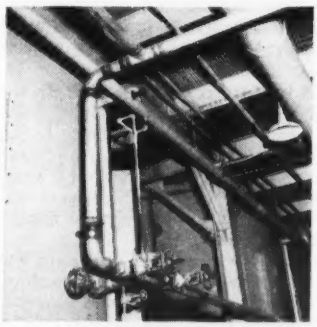
(Vibrating screen separator is product of The Sweco Separator Division of Southwestern Engineering Company, Dept. CP, 4800 Santa Fe Ave., Los Angeles 58, Calif.)

Check 2962 opposite last page.

Light-wall stainless piping cuts material costs in half

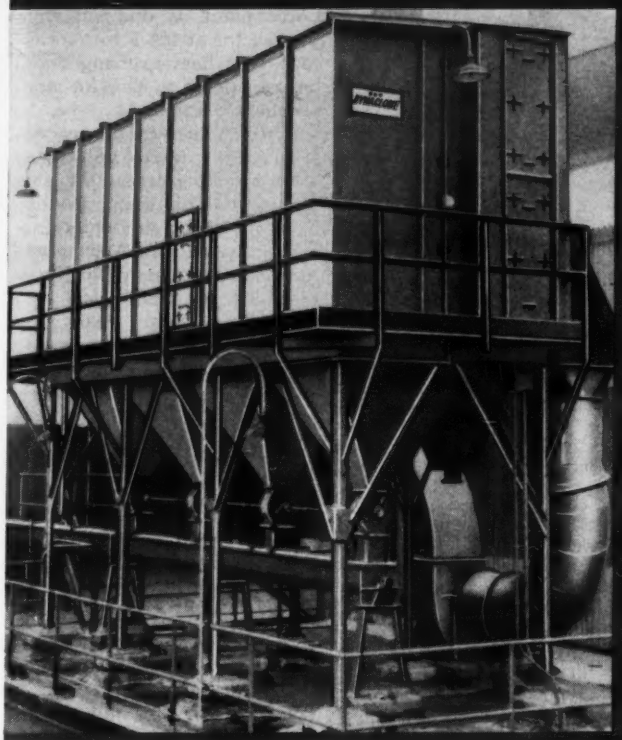
Prevents possible contamination of dye in textile mill

Primary reason for stainless steel piping being used for water and steam lines throughout the recently opened plant of Cherokee Textile Mills in Tennessee, was to prevent any



Typical installation of light-wall stainless piping. Note long straight section on welding fittings which simplifies installation

Now . . . a New High in Dust Filter Efficiency . . .



New SLY "ROLL-CLEAN" Dynaclone

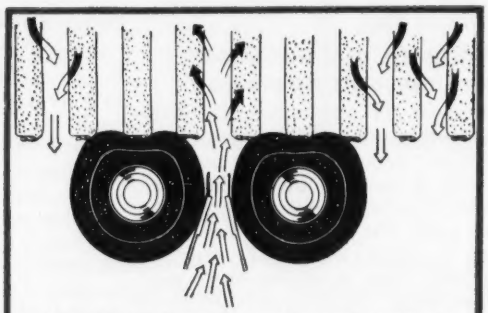
The original self-cleaning dust filter, the Dynaclone has proven itself the most efficient dust filter ever made. The "Roll-Clean" Dynaclone combines design simplicity and rugged construction to insure even greater operating efficiency . . . even longer trouble-free service.

THESE NEW FIELD-PROVEN FEATURES

- Easier filter bag changing.
- Greater cloth area.
- Fewer operating parts.
- Free-rolling cleaner — no sliding.
- Complete dust seal — automatic seal adjustment.
- Easy access to all dust filter parts for inspection and servicing.

PLUS THESE TIME-TESTED DYNACLONE ADVANTAGES

- Constant suction at dust sources — complete dust collection.
- Self-cleaning for continuous operation.
- No auxiliary motors or blowers required for filter-bag cleaning.
- Greater filtering capacity and smaller space requirements — more cloth per cubic foot of filter than any other make.
- Lower power requirements.



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

NEW CATALOG

36-page Bulletin 104 gives full details about "Roll-Clean" Dynaclone and other Sly Filters . . . contains valuable engineering information. Write for copy.

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OFFICES IN PRINCIPAL CITIES

Check 2963 opposite last page.

possibility of dye contamination from the pipe.

When the project was started engineers suggested that Schedule 10 type 304 Stainless be used in place of Schedule 40 due to the tremendous savings in material costs that could be made. Use of Schedule 10 actually cut material costs in half.

It is estimated that 20% was saved through the use of welding fittings over threaded fittings. Welding fittings used have a long straight section. This additional clearance facilitates insertion into flanges, simplifies curved joints, and minimizes welding.

(Light-wall stainless pipe and Speedline fittings are product of Horace T. Potts Co., Erie Ave., D St., Philadelphia 34, Pennsylvania.)

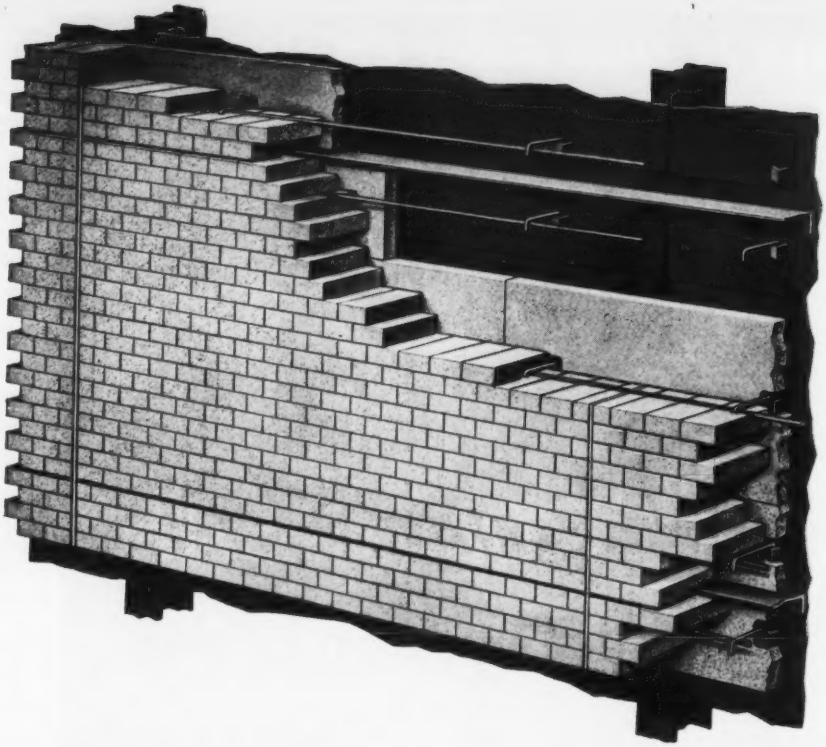
Check 2964 opposite last page.

Cold exchanger resists 400°F oleum surge without cracking

Impervious graphite pipes on unit readily absorb shock

Problem: Oleum, one of the by-products in making DDT for insecticides at Michigan Chemical Corporation's St.

"I wish to report a cracking unit . . ."



B&W Insulating Firebrick sectionally supported wall construction, horizontal rod-type anchoring

Can this construction cut your costs?

Simplified design and lower material costs in initial construction, ease of installation and maintenance, reduced downtime and economy of operation—these are the benefits of this *lightweight* insulating firebrick construction.

Here's what lightweight means. Compared with dense fireclay refractory materials that weigh from 125 to 140 lb per cu ft, lightweight insulating firebrick weigh approximately 26 lb per cu ft for B&W's 2000 degree brick. This difference provides two major advantages: (1) mechanical, which largely affects design and construction, and (2) thermal, which saves in maintenance, downtime and operation.

Savings in design and construction

The use of lightweight IFB simplifies engineering requirements and reduces costs. A minimum of detailing is needed, since the design is engineered around one standard shape — a feature of B&W IFB constructions.

Material requirements are simplified, too. B&W IFB can be tailor-cut, drilled or shaped as necessary, eliminating the need for costly special fired shapes, and the delays in obtaining them. Typical sections, such as burner openings, observation ports and tube supports, can be cut and shaped on the job in minutes, using ordinary woodworking tools.

Substantial savings are possible in structural steel, since insulating firebrick roof and wall constructions are lighter. In locations with soil of poor load bearing capacities, this lightweight may also result in reduced foundation costs.

These savings, coupled with B&W's engineering and service facilities available during the design phase, mean lower initial costs.

Savings in maintenance, downtime and operation

Lightweight IFB offer a major thermal benefit—they store and conduct less heat. Heavy refractories retain heat; in the event of forced shutdown, they can cause burn-out of expensive alloy tubes, where used. The low quantity of heat stored by B&W IFB can be quickly dissipated, thus protecting these expensive tubes.

Further, this low heat storage permits faster heating and cooling. This means quicker access to the furnace in the event of emergency shutdown. Your maintenance crew can get in the furnace sooner and get it back on stream faster.

Supplied from nearby warehouses

With the use of simplified IFB constructions, refractory repairs can be quickly and easily accomplished with standard shapes from a nearby warehouse. This eliminates costly delays in obtaining special shapes.

Anchoring devices, too, are simplified. Since there are no expensive special castings in B&W IFB constructions, carbon steel or low alloy rods can be used. These are generally available from any local steel warehouse.

Increased efficiency

Generally, the lighter a firebrick the better an insulator it is. Since B&W IFB are the lightest insulating firebrick made, they are the most efficient insulators. Per inch of thickness, B&W IFB provide more insulation than any other refractory material. The result is that for walls of equivalent thickness less heat is lost with B&W IFB. Casing temperatures are lower, thus improving working conditions. This means increased efficiency and reduced operating costs.

R 538

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO. REFRACTORIES DIVISION

GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.

WORKS: AUGUSTA, GA.

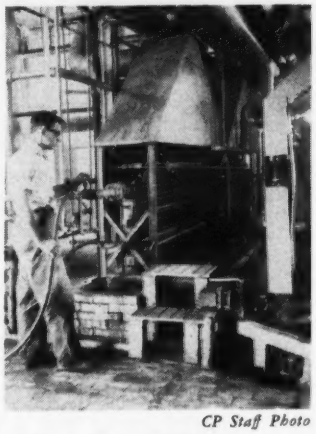
Check 2965 opposite last page.

NEW SOLUTIONS

Louis plant, is dumped from the reactor at 400°F into a cascade-type heat-exchanger and brought down to 90°F for storage before shipment.

Bottom pipes in this counter-current heat-exchanger were cracking when the slug of hot acid hit them, as they were cold from the water cascading over them. A temperature change of over 300°F was too much for them.

Solution: Four years ago they replaced the bottom two



CP Staff Photo

Bottom pipes of cascade cooler withstand jolt of 400°F oleum without cracking or corroding

pipes of the exchanger with impervious graphite pipes. Known as Graph-i-tite pipe, it has a coefficient of thermal expansion of 11×10^{-7} in/in/°F.

Results: The pipe has withstood repeated use throughout these four years. Its corrosion resistance is excellent.

(Graph-i-tite pipe is product of Falls Industries, Inc., Aurora Blvd., Solon, Ohio.)

Check 2966 opposite last page.

FOR PETROCHEMICAL ENGINEERS

Regular section on petrochemicals starting in February will contain editorials designed especially to meet the needs of petrochemical engineers in the more than 400 petrochemical plants already on stream in the United States.

THAT'S INTERESTING

Small and tough

High resistance to vibration is feature that hilights this small pressure pick-up. It is specially suited for in-flight missile uses. Eight-oz, 1⅝-inch device is designed for absolute and differential pressure measurements in ranges up to 100 psi at temperatures from −65 to 200°F.
High level output eliminates a need for signal amplifying equipment.

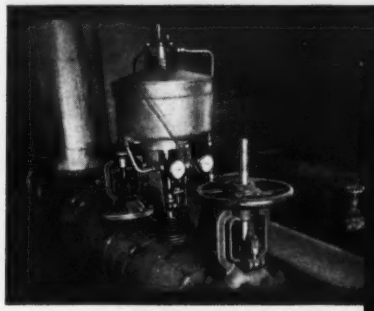
Addict's aid

A new hope for drug addicts may not be far off. In new research normorphine, a close chemical relative of morphine, proved to be active in pain relief and caused relatively mild side reactions in animals. Drug could be given to morphine addicts in place of morphine. If normorphine treatment was stopped only relatively mild abstinence signs appeared instead of severe distress which is often caused by the withdrawal of morphine.

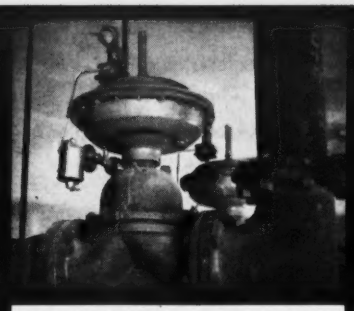
For more information on product at right, specify 2967 see information request blank opposite last page.

CREATED FOR THE JOB

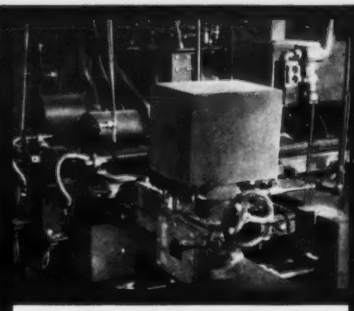
by CONOCONTROLS Specialists



Conoflow LB Valve on a difficult liquid level control job in a Barrett Div. plant of Allied Chemical & Dye Corp. This valve is handling hot coal tar at temperatures to 750° F.

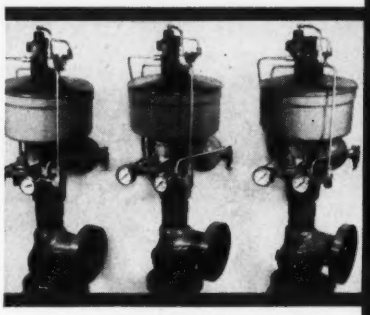


Conoflow Saunders Valves used in conjunction with Fuller Company's Airveyor System in a midwestern cement plant. These close-coupled "on-off" valves are equipped with solenoids and armored position indicators.

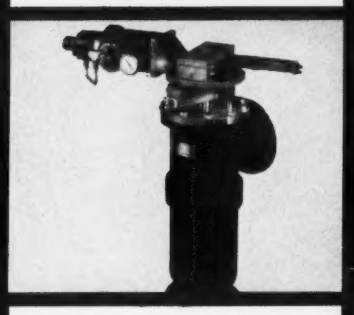


One of several Conoflow Rotomotors on a unique service in Owens-Corning's Newark, Ohio plant. This powerful pneumatic actuator positions a large circular saw which automatically trims and cuts a continuous sheet of Fiberglas into stock widths.

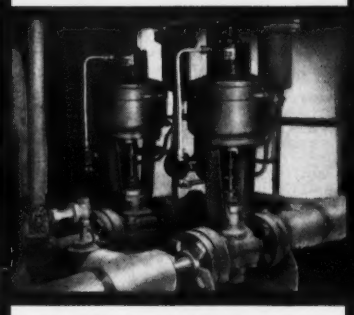
Conoflow Pressure Transmitters for the Kraft Foods Company. They will be used with miniature recorder-controllers to give visual indication and record of levels and pressures in vegetable oil vessels.



These 3" Conoflow "S" Valves are going to the Aluminum Co. of America in the new St. Louis pilot plant. They will be handling hot flashing caustic liquor containing 7% suspended solids with pressure drops up to 300 psi.



Cylinder Conomotor affords remote manual or automatic adjustment of flow rate for a Kates direct-acting flow regulator. This is one of many OEM applications for Conoflow's versatile pneumatic throttling actuator.



These Conoflow LB Valves have been on a tough temperature control service for over three years in the plant of this large manufacturer of floor covering and insulation. More than 600 Conoflow LB Valves are in use throughout this plant.

Conoflow Airpak filter-regulators being tested prior to shipment to duPont. Other large volume Airpak users are: Phillips Petroleum, Leeds & Northrup, Catalytic Construction, Minneapolis-Honeywell, and Fischer & Porter.

While most Conoflow products are shelf items—a good many are not. They are created for the job through our engineering and yours—combined and concentrated on your problem. Shown above are only a few examples of the variety and scope of Conoflow installations. If you are not already a Conoflow customer, phone or write us at 2100 Arch Street, Philadelphia 3, Pa. We'll put you in touch with a Conoflow representative qualified to help you.

Cono-Controls®

CONOFLOW CORPORATION

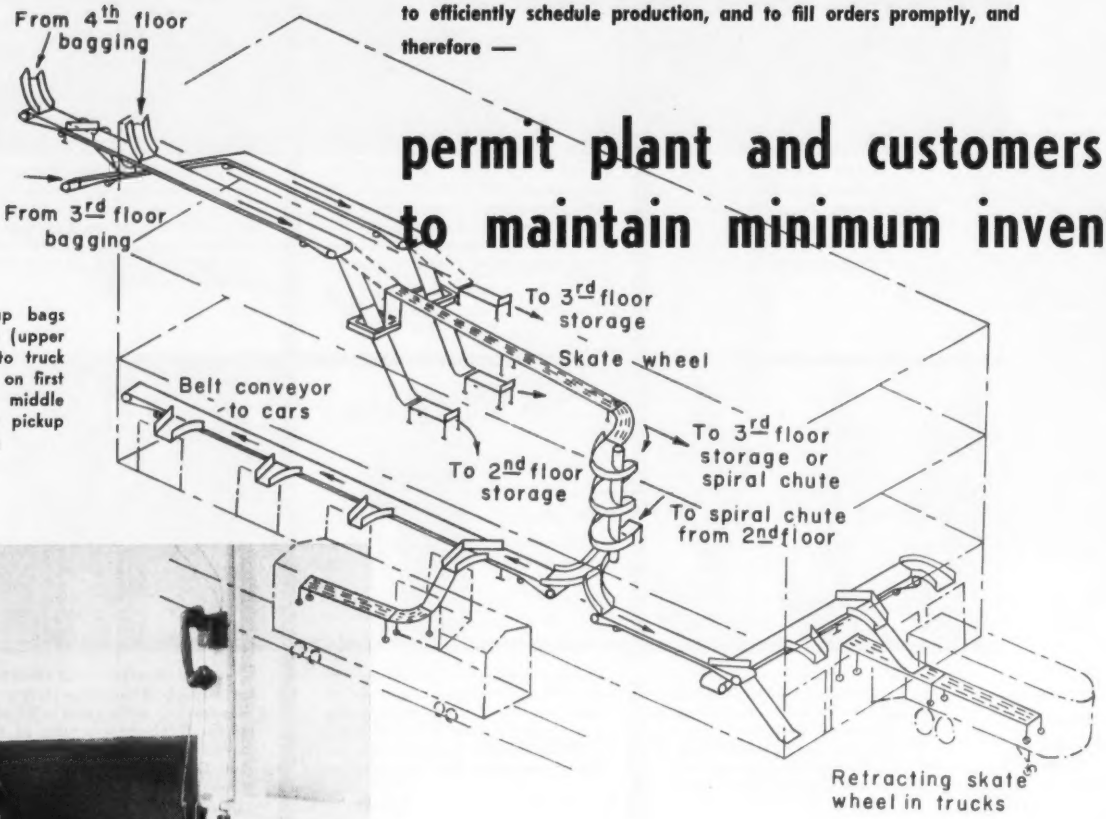
FOREMOST IN FINAL CONTROL ELEMENTS

SUBSIDIARY OF WALWORTH

The battle of the profit squeeze is on! Overloaded inventories tie up cash and keep stocks from rolling through the plant as quickly as possible. Scheduling for minimum inventories means optimizing profits, but requires accurate planning.

Here's how Darling & Company, Chicago fatty acid manufacturer, gears their production management and product warehousing setup to efficiently schedule production, and to fill orders promptly, and therefore —

permit plant and customers to maintain minimum inventories


From 4th floor bagging
From 3rd floor bagging
To 3rd floor storage
Skate wheel
Belt conveyor to cars
To 3rd floor storage or spiral chute
To 2nd floor storage
To spiral chute from 2nd floor
Retracting skate wheel in trucks

Conveyor set-up picks up bags from bagging department (upper left) and delivers them to truck or boxcar shipping docks on first floor. System is open in middle to permit delivery to or pickup from storage areas

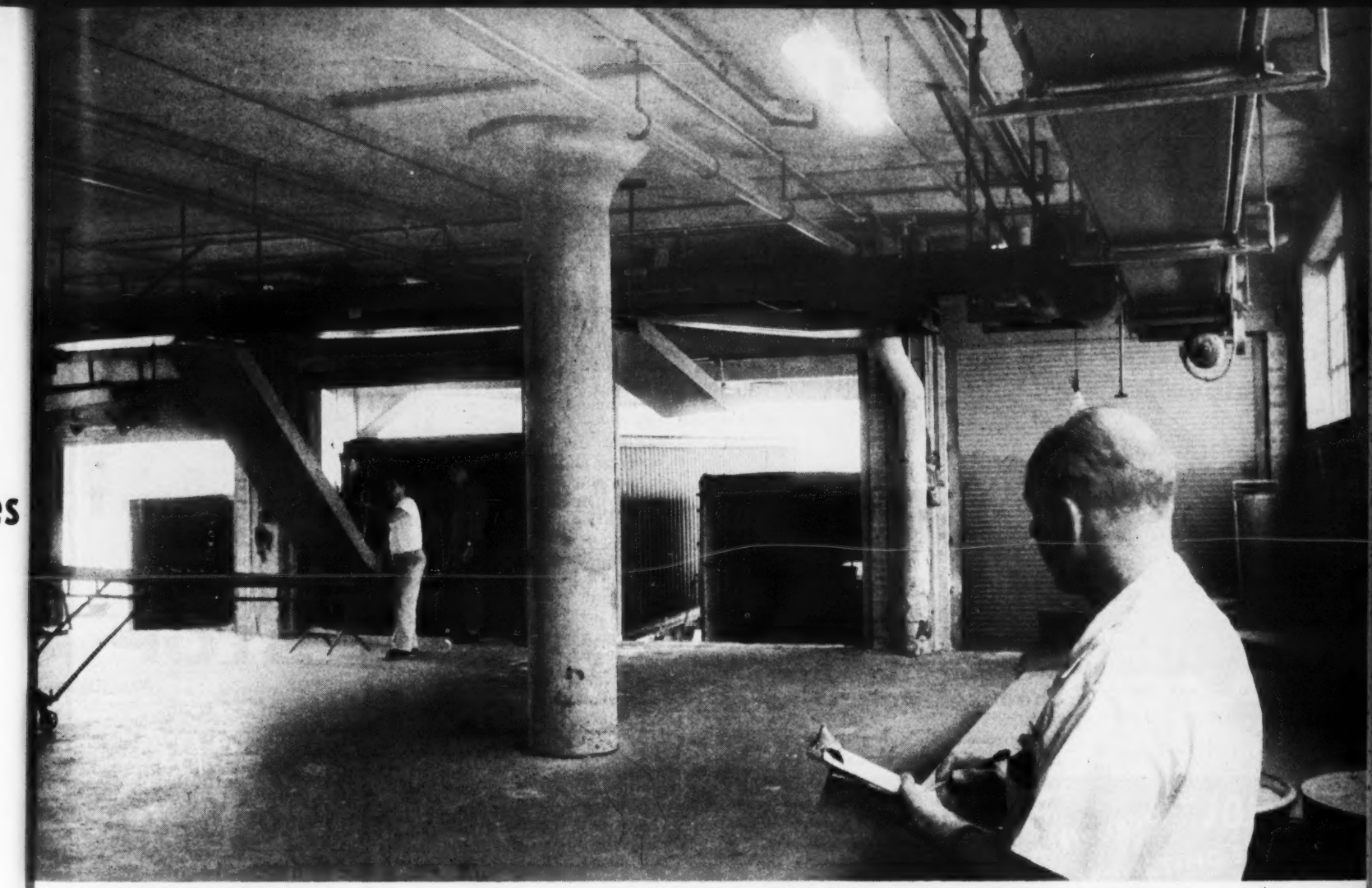
Production control man Ray Jones checks Acme index file as first step in expediting order telephoned from main office. Stock, location, and specs of over 100 products are kept at his fingertips by this system

ON A hot Friday morning during this past summer, a rubber products manufacturer suddenly realized that his Ohio plant desperately needed stearic acid by that very next morning, or it would face the possibility of shutting down.

He called the local Darling & Company salesman who phoned the order to his home office in Chicago, explaining its urgency. There was no panic, no confusion. Production, warehousing, and shipping were geared for speed.

As soon as the phone was hung up, the order department relayed the order to the production control man at the plant. Material was in inventory, so the production man wrote a shipping order for the quantity ordered. He sent a copy to the billing department, for accounting purposes, and a copy to the shipping foreman, who immediately arranged for a truck to pick up the order that afternoon.

Meanwhile, production control ordered the material from the warehouse and had the order assembled, ready to be fed onto the warehouse conveyor system. That afternoon when the truck backed up to the loading platform, the portable wheel conveyor was rolled into the truck



Shipping Superintendent Arthur Turgeon checks loading of bagged products into truck. Overhead conveyor simultaneously moves many different materials from warehouse efficiently and quickly

Photos By CP Staff

and the bags were fed directly to it.

After the truck was loaded and left the warehouse, Darling's traffic department followed up to make certain that the shipment was expedited by the trucking outfit.

Customer was notified as to the name of the trucking company, truck number, and even the name of the driver and what stops he had scheduled before he made his delivery at the customer's Ohio plant.

As a result, delivery was made that following morning, and plant's production schedule was not interrupted.

This type of service is not unusual for Darling. Their customer service operations are geared to handle orders exactly when and how a customer requests. Special problems are given individual attention.

The Chicago plant location offers geographical and transportation advantages in giving nation-wide service. Fifteen warehouses throughout the country help in speeding deliveries.

However, all this requires much planning.

Why Low Inventories?

The profit squeeze, which chemical companies are not alone in experiencing these months, has made management more conscious of ways in which money can be conserved.

The purchasing department wants to schedule purchases as far ahead as possible in order to obtain volume economies, yet the production department wants to minimize cash tied up in inventory and keep raw materials flowing into the process almost on a hand-to-mouth basis, thus optimizing profits.

To keep inventories at a minimum, manufacturers must have good planning and a dependable source of supply and transportation. When an emergency arises as it did with the Ohio rubber products plant, and a raw material must be obtained a little more quickly than usual, the supplier must be flexible enough to give fast delivery.

Management and Plant Setup — Both Must Be Efficient

Let's take a look at how Darling solved this problem in its own plant, and yet gives quick delivery of orders to its customers so they too can keep inventories low.

To meet the requirements of the many industries using fatty acid products, Darling and Company has set up flexible order- and material-handling systems at their main plant and offices in Chicago, Illinois.

In addition to streamlining their office procedures, Darling's plant operations were also streamlined.

At the warehouse, status of all finished materials (Darling catalogs over 100 different products) is kept in an Acme visible card index by the production control man. All materials that are in process are also tabbed.

Darling, too, believes in close scheduling. Finished products in their three-story warehouse account for only 25% of all materials in the entire plant. About 50% are in process, and the remaining 25% are in inventory, awaiting processing.

The high percentage of in-process material allows the manufacturing department to meet

special orders with minimum delay. For example, if special specifications are called for, an in-process material can be diverted. This is facilitated by plant's complete laboratory control set-up.

The company has another particular advantage. A direct pipeline leads from their rendering plant to their fatty acid products plant. If it does happen that a particular raw material is not available in their tank farm, they can obtain it on short notice.

Plant uses a daily conference of all department heads for management planning. Both long- and short-term plans are catalyzed into action at these meetings. By this system, the production efforts of 18 individually operating processes and three departments are coordinated into a flexible and efficient production team.

Material Handling

Majority of Darling's products sold as solids are packaged, stored, and shipped in multiwall bags. This creates a handling problem which management hurdled by devising and installing an efficient and flexible warehousing and material-handling system.

This is illustrated in diagram, which shows the three-story warehouse in outline. This building adjoins packaging department which is just off to the left of warehouse.

Bags enter warehouse on third-floor conveyor as soon as they leave bagging machines. They move immediately to shipping dock for loading, or to storage on second and third floors of warehouse. Switch system at bottom of spiral chute permits transfer of bags to either freight cars or to truck loading platforms.

Conveyor system is "open" at both ends, with optional pickup and delivery in the middle. Conveyor is designed to either fill or empty the warehouse at minimum unit cost, and with maximum speed and flexibility. It is especially good in handling orders requiring a number of different materials.

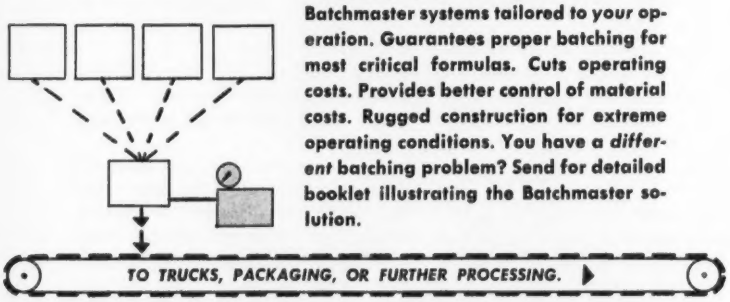
PUSH BUTTON BATCHING

BATCHMASTER speeds chemical processing

At last, completely automatic one-man batching for *you*. Batchmaster is the simple, speedy system for precise mixing of multiple ingredients to any desired formula. Accommodates all materials — solid, powdered, granulated, liquid. Provides *continuous* automatic control of all ingredients by weight. Boosts production, improves quality control, eliminates waste.

Simply dial the formula and mixing times, select number of batches, and press start button. Any number of ingredients are automatically fed, weighed, mixed and discharged.

No need for expensive, complex custom installations. Howe engineers *standard* Batchmaster systems tailored to *your* operation. Guarantees proper batching for most critical formulas. Cuts operating costs. Provides better control of material costs. Rugged construction for extreme operating conditions. You have a *different* batching problem? Send for detailed booklet illustrating the Batchmaster solution.



Write for Complete Details

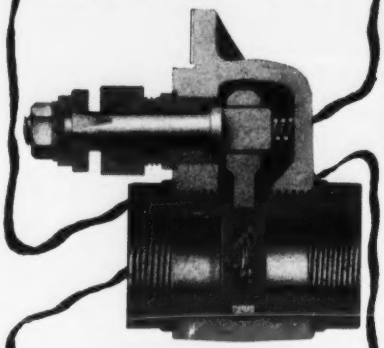
HOWE

THE HOWE SCALE CO. · RUTLAND, VERMONT

A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

Check 2968 opposite last page.

FULL-FLOW *Okadee* VALVES NON-LUBRICATED



POSITIVE STOP

FOR

- Steam
- Air
- Ammonia
- CO_2
- Gasoline
- Propane
- Styrene
- Butadiene
- Lube Oils
- Jet Fuels

Available in Stainless Steel or Steel, Chemically Nickel Coated

You can select Okadee Valves for flow by pipe size — and get full-flow and positive shut-off with virtually any liquids and gases.

Quick-opening, metal-to-metal disc valves and seats require no lubrication — virtually no maintenance for hundreds of thousands of operations . . . Real valve *performance* and *service*.

FACTS AND FIGURES

. . . on Okadee Valves will be sent promptly on request. Sizes ½" to 8"; A.S.A. dimensions; screwed or flanged. Valve seats and discs Stellite or stainless steel; your choice of operators.

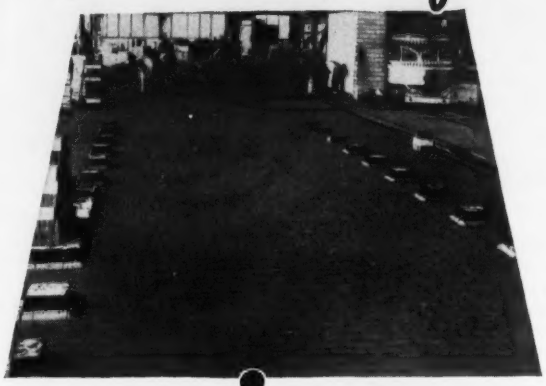
- Write for Bulletin CP6

Okadee COMPANY

332 SOUTH MICHIGAN AVENUE
CHICAGO 4, ILLINOIS

Check 2969 opposite last page.

THIS FLOOR IS
Corrosion-proof



SAUEREISEN No. 40

was used in laying this floor at a major brewing plant. Bottling alkalis and food acids resulting from processing have no effect on such a floor, because it is water-proof, and easily kept clean. Sauereisen No. 40 is a quick-setting, self-hardening resin base cement providing a mortar that can be troweled, so that floors are lastingly corrosion-resistant.

40 A *Tell us your floor problems! Write for catalog.*

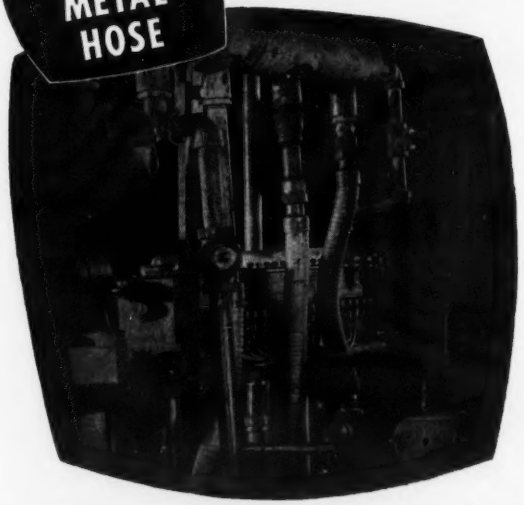
Sauereisen Cements Co., Pittsburgh 15, Pa.

Check 2970 opposite last page.

Get Maximum Efficiency and Economy

with **UNIVERSAL METAL HOSE**

All Metal Hose Products Convey Gases • Solids and Fluids Under High Temperature Pressure • Vacuum Conditions



Ask for INDUSTRIAL ALL-METAL Flexible HOSE Catalog ID-100.

Quality . . . ALL METAL FLEXIBLE HOSE PRODUCTS

UNIVERSAL METAL HOSE CO.

2189 South Kedzie Avenue, Chicago 23, Illinois

Check 2971 opposite last page.

Expediting system is working out very satisfactorily. Production control, flexible plant scheduling, and the conveyor are important keys in this system.

(Spiral drop conveyor (reaching from the third to the first floor) was made by a local metal shop, to Darling's design. Rapistan belt conveying system was made by The Rapids Standards Co., Inc., Grand Rapids 2, Mich.)

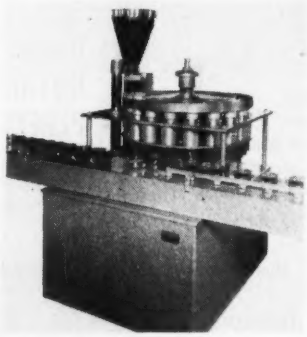
Check 2972 opposite last page.

Effective dust control feature on rotary filler

Uses: For filling containers with powders at speeds up to 300 per minute.

Features: Unit provides dust control, high speed, and accuracy.

Description: Rotary filler is fully automatic. Change-over from one container size to another can be accomplished in a matter of minutes. All



Powered by a ½-hp motor, high-speed rotary unit fills containers with powders without any dust problem

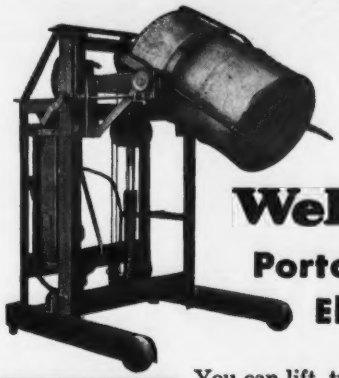
contact parts are either stainless steel or aluminum. Special trip device provides for "no container — no fill."

Bearings throughout machine are sealed. Filling machine is 40" wide, 48" deep, and 72" high. Average conveyor length, supplied, is 10'.

(Whiz-Packer rotary filler is product of Frazier & Son, 20 Industrial West, Allwood, Clifton, N. J.)

Check 2973 opposite last page.

Simplify, Speed Up DRUM HANDLING



with New

Weld-Bilt Portable Drum Elevator

"Weld-Bilt" PRODUCTS

You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on this important time and labor-saver.

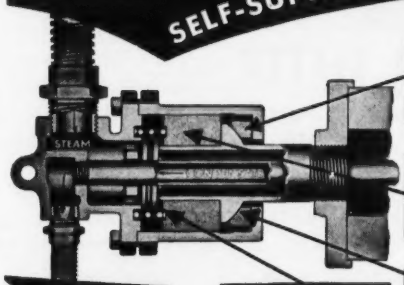
WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

Check 2974 opposite last page.

JOHNSON Rotary Pressure JOINT

SELF-SUPPORTING TYPE



1. **SEAL RING** — of special carbon-graphite. Eliminates packing and oiling.
2. **GUIDE** — Also of carbon-graphite. Makes joint self-supporting.
3. **NIPPLE** — Rotates with roll, seals against ring.
4. **SPRING** — For initial seating only. In operation joint is pressure sealed.

Only 4 Internal Parts

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been adopted by dozens of machinery makers, and is finding new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. *Write for literature.*

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

Check 2975 opposite last page.

Controlled Sifting FOR BETTER QUALITY!

With gravity sifting methods, there's danger of uneven dispersion . . . depending on the mix and its ingredients. When you use the high speed, centrifugal

abbé
TURBO SIFTER

perfect dispersion of the ingredients is assured. Users with colored ingredients stress the greater uniformity of color that the Abbé Turbo Sifter gives them. This is true for *any* material and with any mesh.

Sifts 2 to 10 Times Faster... and Uses Less Floor Space

This unique unit requires less than one-fourth the floor space of conventional units, but sifts 2 to 10 times as fast, depending on the product — with a clean, complete separation. Write for Bulletin No. 65.

Address Department 46

abbé ENGINEERING CO.
50 CHURCH ST., NEW YORK 7, N. Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Cutters • Mixers

Check 2976 opposite last page.

PACKAGING

Desiccant for packages reduces inside humidity to less than 10%

Uses: As desiccant for Method II dehydrated packaging.

Features: Product is designed to reduce relative humidity of package to less than 10%, affording complete protection against rust, corrosion, and mildew.

Description: Activated montmorillonite desiccant meets all requirements of military specification MIL-D-3464B. One 32-gram unit of desiccant will adsorb at least 3 grams of water vapor at 20% relative humidity, and 6 grams of water vapor at 40% relative humidity. Desiccant can be reactivated in conformance with MIL-D-3464B by heating at 245-260°F for 16 hours.

(Protek-Sorb "88" is product of Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore 3, Maryland.)

Check 2977 opposite last page.

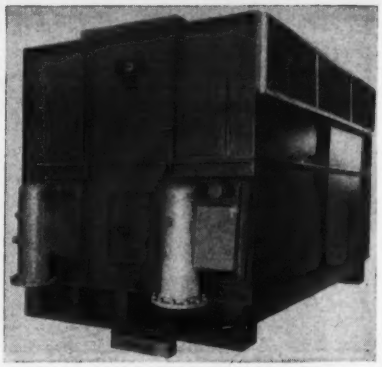
Impacker data

Data sheet on impacker for packing into burlap, cotton, and jute bags, describes operation of equipment and lists specifications. Data sheet 5702 — Richardson Scale Company, Van Houten Avenue, Clifton, New Jersey.

Check 2978 opposite last page.

". . . Need the opener, Al?"

REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER



Niagara Aero Vapor Condenser Panel Casing construction gives access to all parts, saves first costs in shipping and installation.

With free air the cooling medium, you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This air-cooled condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often profit by recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact, easily maintained unit replacing both cooling tower and barometric or surface type condenser.

Maintenance expense is low. Niagara Aero Vapor Condenser Panel Casing construction gives access to all parts, saves first costs in shipping and installation. Summer-winter dampers and Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

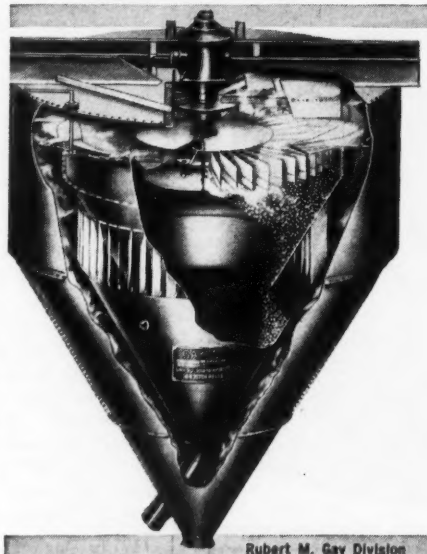
Constant temperature, uniform products and maximum production 12 months a year are assured. Capacities up to 15 million BTU/hr.

Write for full information. Ask for Bulletin 129R

NIAGARA BLOWER COMPANY
Dept. CP-1, 405 Lexington Ave., New York 17, N.Y.
Niagara District Engineers in Principal Cities of U. S. and Canada

Check 2979 opposite last page.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR

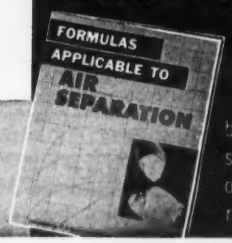


GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy Duty Models.



this helpful booklet sent on request

Rubert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 2980 opposite last page.

Four-color printing on plastic, paper, with low-cost unit

No ink or printing plates required

Uses: For printing of multi-color designs on cellophane, plastic film, or paper packages during packaging operation.

Features: Low-cost unit does not require use of ink or printing plates, and can be attached to any standard wrapping, bundling, or bag-making machine.

Description: Printing machine enables packager to make use of low-cost unprinted stock and apply his own custom designs to wrappers as integral packaging operation, or to use partially pre-printed stock and insert variable imprint required. Designs may be of any shape, or any size up to 3 by 4", and may include up to four different colors.

All colors are laid down simultaneously in simple direct-transfer action which permits placing of prints on either face or underside of packaging material. Machine is fully automatic, synchronizing with packaging machine's operation to produce up to 100 impressions per minute, and is adjustable for accurate positioning of a design at any desired location on wrap.

("Imagraph" machine is product of Adolph Gottscho, Inc., Hillside 5, N. J.)

Check 2981 opposite last page.

Steel shipping container

Four-page bulletin describes manufacturer's complete line of versatile, nestable, self-palletizing, compact-storing, quickly assembled steel shipping containers. Contains details on assembly, advantages, capacities, and specifications. Band-box shipping container bul — Ackermann Manufacturing Co., subs. of Wheeling Steel Corporation, Wheeling, West Virginia.

Check 2982 opposite last page.

PICK-UP PACK...ONE-TON SIZE

Gaylord Boxes

Each of these Drumpak corrugated containers holds 2000 lbs. of bulk granular chemicals. This same amount was formerly packed in 20 hundred-pound units. By consolidating his product in Drumpaks, this manufacturer reduced handling manhours by 80%. The Drumpak is easy to pick up, warehouse and load into freight cars.

Drumpaks are another Gaylord development. To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

Check 2983 opposite last page.

new, improved **DUSTEX COLLECTOR**

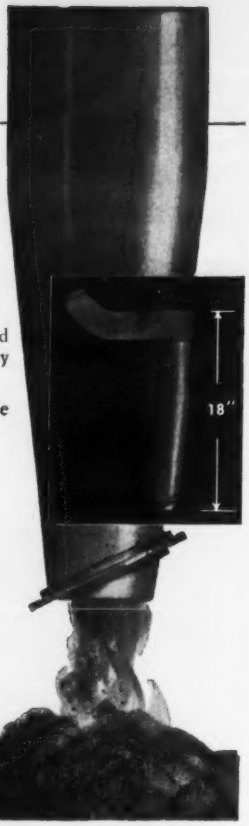
solves more recovery problems...costs less to install...

A major design improvement on the widely used and highly regarded DUSTEX Collector assures you efficiency —*superior to collectors costing much more.*

ALL NEW TUBE DESIGN—Longer, larger cast tube produces the following results...

- **Greater capacity with less air flow resistance**
- **Higher abrasion resistance**
- **Ability to handle inherently sticky materials**
- **Self-cleaning action**
- **Highest efficiency ever — at lowest cost**

ALREADY PROVEN in numerous field tests on the most difficult dusts, the new improved DUSTEX Collector is ready to go to work for you now. Write for descriptive literature and details today.



DUSTEX CORP. P.O. Box 2520 • Buffalo 25, N. Y.

Check 2984 opposite last page.

for more accurate chemical feed control at LOWER COST use a...

"Packaged"

NEPTUNE CHEMICAL FEED UNIT

Tank, agitator and pump are combined in one smooth operating system that precisely proportions anything from treating chemicals, such as calgon, to petroleum distillates.

JUST PIPE-IN . . . PLUG-IN . . . AND OPERATE!

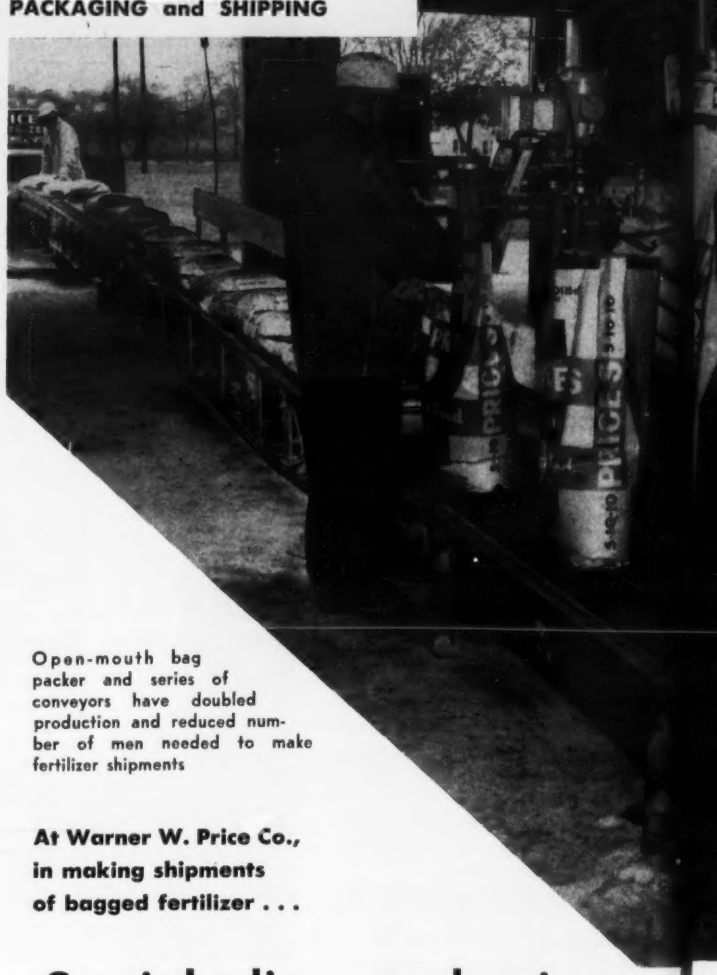
You'll get positive, accurate proportioning of chemicals when you use a NEPTUNE "packaged" chemical feed unit. That's because tank, agitator and pump are designed and built into one precisely-engineered chemical feed system. In addition to lower first cost and minimum upkeep, longer life is assured by 316 stainless steel piston, valves and ball checks.

- **simply designed pump can be regulated easily to proportion exact quantities of chemical continuously**
- **agitator keeps precipitates from settling, assuring constant solution strength**
- **Y-type strainer removes harmful solids, prevents pump damage**

Write, wire or call for additional details and let us bid on your requirements.

NEPTUNE PUMP MANUFACTURING CO.
chemical proportioning pumps and sump pumps
4912 NORTH 6TH STREET
PHILADELPHIA 20, PA.
phone: DAvenport 9-4983

Check 2985 opposite last page.



Open-mouth bag packer and series of conveyors have doubled production and reduced number of men needed to make fertilizer shipments

At Warner W. Price Co., in making shipments of bagged fertilizer . . .

Straight-line packaging doubles production

Problem: In keying packaging operations to customer demand so as to minimize storage space, the Warner W. Price Co., Smyrna, Delaware, discovered that existing packaging and handling equipment could not meet production demands.

The Price Company manufactures a line of fertilizers. Part of plant's output is in 125-lb burlap bags. Remainder is packaged in 80-lb multiwall bags.

Procedure of loading filled bags was a manual operation. Bags were lifted onto a two-wheel hand truck, pushed to customer's truck, lifted off hand truck, and stacked in place. Hand truck was then wheeled back to packer for another load.

Solution: A straight-line packaging-conveyor system was incorporated into the operation.

Filling machine, an open-mouth packer, handles both burlap and multiwall bags at a rate of 16 bags per minute. Series of conveyors carry filled bags from packer through sewing machine to loading dock. An expandable conveyor carries bags right onto waiting trucks.

Thus, the only manual lifting of filled bags occurs when man on truck removes bags from conveyor and stacks them in place.

Results: Production has been doubled. The previously used bag packer handled only eight bags per minute, whereas the open-mouth packer

handles 16. Machine is capable of handling 24 bags per minute, if Price Co. should ever want to up production rate.

Use of the conveyors has not only aided in speeding up production, but has also released two men formerly employed on loading dock for more productive work inside the plant.

Price also reports that they are getting a much greater degree of accuracy in weights by achieving weight tolerance of two ounces.

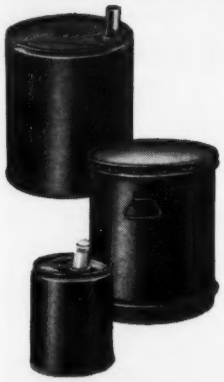
(Rapid-Weigh Bagger is manufactured by Bemis Brothers Bag Co., 408 Pine St., St. Louis 2, Missouri.)

Check 2986 opposite last page.

(Conveyors are manufactured by A. B. Farquhar Div., Oliver Corp., York, Pa.)

Check 2987 opposite last page.

VULCAN STEEL PAILS



The manufacturer needing a small package for his requirements can choose exactly the right size and type from the complete Vulcan line of steel pails. Vulcan offers a choice of gauges in both lug cover and closed head types in sizes ranging from one to fifteen gallons.

VULCAN STEEL DRUMS

These drums are the choice of leading manufacturers for the shipment and storage of liquids, plastics, crystals, semi-solids, and powders. All standard drum gauges are available . . . check with us regarding closures and accessories.

CHECK WITH VULCAN ON THESE TOO!

GREASE DRUMS . . . Available in both 120 and 100 pound capacities.

15 GALLON DRUMS . . . A new addition to the Vulcan line—available in open head and closed head types.

VULCAN

Vulcan offers real flexibility with a choice of linings, closures, accessories, and various painting and decorating services. Mail coupon for full information and the name of your Vulcan representative.

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in: CP-18

☐ Pails, in the following sizes_____

☐ Hi-Bake protective linings for (product)_____

☐ 55 gallon drums.

Please get this information to

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Check 2988 opposite last page.

BLOCKSON

another

ONE STOP

shipment of Sodium Phosphates from BLOCKSON

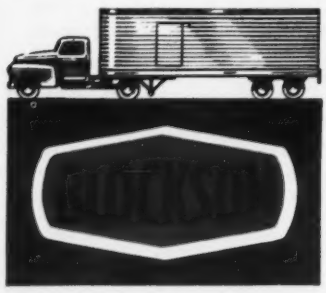
Mixed carloads of BLOCKSON phosphates simplify your purchasing job. ONE shipment instead of many. Faster ONE STOP delivery. ONE collect phone call to order all chemicals listed below—or to make schedule changes. Carload price on each chemical—from a supplier with the CAPACITY to stand by its customers. Call BLOCKSON or your BLOCKSON distributor soon.

BLOCKSON CHEMICAL COMPANY

Joliet, Illinois

Division of Olin Mathieson Chemical Corporation

...SAME ADVANTAGES FOR MIXED TRUCKLOAD BUYERS



Sodium Tripolyphosphate • Trisodium Phosphate • Tetrasodium Pyrophosphate • Tetrapotassium Pyrophosphate • Sodium Polyphos (Sodium Hexametaphosphate-Sodium Tetraphosphate) • Sodium Acid Pyrophosphate • Trisodium Phosphate Chlorinated • Disodium Phosphate • Monosodium Phosphate • Hydrofluoric Acid • Sulfuric Acid • Sodium Fluoride • Sodium Silicofluoride • Hygrade Fertilizer • Teox 120 (Nonionic Surfactant)

WAREHOUSE STOCKS AT ALL BLOCKSON DISTRIBUTORS

Check 2989 opposite last page.

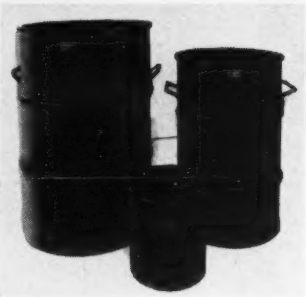
PACKAGING

Corrosion-resistant drums in 30- and 55-gal sizes

Uses: For storing acids, caustics, plating solutions, and all types of corrosives.

Features: Vinyl plastisol coating bonded to steel drum resists all corrosive action, and its extreme toughness makes it highly resistant to physical damage.

Description: Corrosion-resistant drums and buckets are coated with Miccrosol vinyl plastisol. Drums are available in 30- and 55-gallon sizes, with securely welded handles for easier handling.



Corrosion-resistant drums are coated with Miccrosol vinyl plastisol

(Corrosion-resistant drums and buckets are products of Coating Division, Michigan Chrome and Chemical Co., 275 Iron St., Detroit 14, Mich.)

Check 2990 opposite last page.

FOR MORE INFORMATION

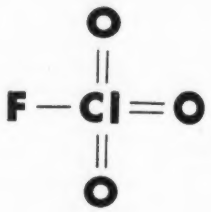
Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

PERCHLORYL FLUORIDE — developed originally as a high-energy chemical — is now available to our industry. As a chemical product, this compound should find many uses: as an oxidizing agent, for fluorination, and for perchlorylation of organics. The perchlorylation reaction — involving the introduction of a $-ClO_3$ group, bonded through the chlorine atom, not the oxygen — is unique to PF, and actually opens a

new field of organic chemistry



A new combination of fluorine, chlorine, and oxygen — called perchloryl fluoride — has what might appear to be a highly unstable structure. Although it is quite reactive chemically, it is actually very stable physically, and over a wide range of conditions.

Perchloryl fluoride has high reactivity, yet is safer than liquid oxygen when subjected to shock and radiation. Boiling at −47°C, it is easily handled and stored as a liquid at room temperature.

As a **Chemical Intermediate**, the reactivity of PF (perchloryl fluoride) makes it of interest as a reactant in both inorganic and organic syntheses. Some of the novel derivatives are: difluoromalonic esters and difluoroacetoacetic esters, and aromatic compounds containing $-ClO_3$ groups as ring substituents.

Use of PF permits introduction of fluorine atoms into certain reactive molecules, without undesirable side reactions. Steroids, barbiturates, and ataraxics are only a few of the products to which different properties are imparted by fluorination.

Perchlorylation gives previously unknown aromatic compounds, the study of which may open a new chapter in benzenoid compound chemistry. These reactions are detailed in the next section, Chemical Reactions.

Bleaching — Replacement of chlorine, ozone, or oxygen with PF appears feasible. PF should be investigated for use with, or in place of, chlorine dioxide for bleaching kraft pulp.

Petroleum processing — PF may prove an economical desulfurizing agent for lube oils and petroleum fuels.

Dielectric gas — in lab investigations, PF compared favorably with other currently used dielectric gases. The dielectric strength of PF is approximately 30% greater than that of sulfur hexafluoride. Radiation has very little effect on PF's dielectric strength. Elimination of "glow" and suppression of corona discharge are other advantages of PF.

Blowing of vegetable oils — Pretreatment of drying oils with PF prior to blowing gives faster rate of viscosity increase. This may increase bodying oil plant capacities by allowing for greater kettle productivity.

Cutting and welding — High energy content of PF combined with its oxidizing power make it of potential value in torches, specialized cutting equipment, and chemical machining. Tests indicate that it gives a hotter flame than does oxygen under the same conditions and at a lower gas pressure.

Refrigerant — PF may prove of value in some specialty applications. Care must be taken, however, to assure that no readily oxidized material comes in contact with it. Heat transfer characteristics are similar to ammonia.

Pyrotechnics and explosives — PF absorbed on commonly used porous combustible materials, such as carbon or sawdust, yields sprengel explosives.

Metal processing — Compound offers a convenient means of destroying cyanide residues in electroplating, and as a reoxidizer in metal treatment. In combination with certain other materials, PF will etch aluminum, copper, tin, carbon steel, and some types of stainless steel.

Physical properties of perchloryl fluoride

(99.9% pure)

Melting point (°C)	−146 ± 2
Boiling point (°C)	−46.8
Density (gm/cc)	
Gas (T_c:P_c)	0.637
Liquid (20°C)	1.434
Critical temperature (°C)	95.17 ± 0.10
Critical pressure (atm)	53.00
Critical density (gm/cc)	0.637
Heat of vaporization (kcal/mol)	4.6
Trouton constant (cal/deg. mol)	20.4
Dipole moment (Debye units)	0.03
Vapor pressure (psia @ 25°C)	176.06
Heat of formation of gas @ 25°C (kcal/mol)	−5.12 ± 0.68
C_p/C_v (@ 24°C)	1.12
Entropy of gas @ 25°C (cal/deg. mol, calculated)	66.51
Sp heat of liquid (cal/gm °C)	
@ −40°C	0.229
@ +50°C	0.290

Chemical Reactions

Laboratory studies of reactions of PF with organics indicate a general pattern of reactivity. This is usually greatest where the base strength of the organics is highest.

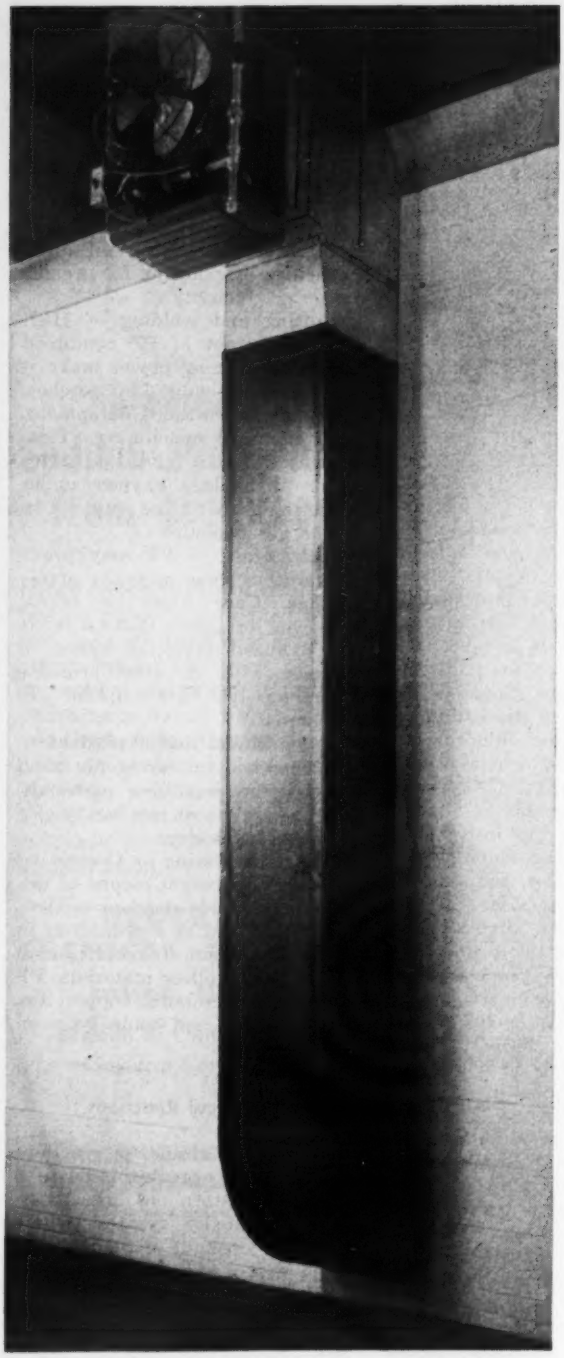
Nucleophilic reagents react readily with PF as do metallo-organics. This is especially the case where the metallic atom is bonded to carbon through another atom, such as oxygen.

The presence of a halogen-metal bond in an organic molecule (such as in Grignard reagents) also facilitates reaction with PF.

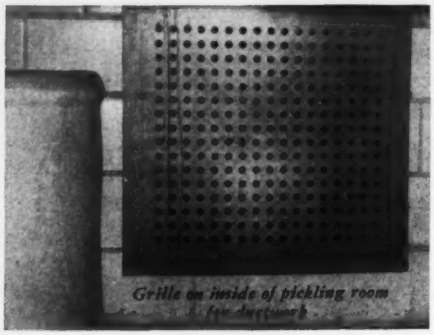
Oxidation — One big ad-

Another new development using

B.F.Goodrich Chemical *raw materials*



Duct carrying heat for pickling room fabricated by Colonial Plastics Mfg. Co. using rigid vinyl sheeting made from Geon. B.F.Goodrich Chemical Company supplies the Geon polyvinyl material.



Grille on inside of pickling room for ductwork

duct of **GEON RIGID VINYL** withstands acids... outlasts metal

ORDINARY metal duct just can't take nitric, sulphuric and muriatic acid fumes. So a large municipal utility has turned to ductwork made from rigid sheets of Geon polyvinyl materials to heat a water meter pickling room, where these acid fumes are present. The duct replacement problem, due to corrosion, is over.

Besides being acid resistant, this ductwork withstands impact, moisture, and oils. The duct and grille were fabricated with ease—conventional sheet-metal forming machinery was used for shearing, bending and punching; welds were made simply and quickly with solvent cement. The light weight of the rigid vinyl assembly made installation speedy.

Rigid vinyl sheets made of Geon material are available from many manufacturers in large sizes, in a range of gauges, in normal or high impact grades. In many places where there's corrosion, they are ideal for ducts, fans, hoods and fume stacks.

You can get a booklet on properties of rigid Geon materials. Write Dept. LJ-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

B.F.Goodrich Chemical Company
a division of the B.F.Goodrich Company

B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

Check 2991 opposite last page.

vantage of PF is that its chemical reactivity increases as temperature increases. This property permits controlled oxidation of such products as waxes, vegetable oils, and metallic salts. It should give it an advantage as a substitute for oxygen in many metallurgical operations.

It will oxidize H_2S to sulfur and then to SO_2, at a controllable rate. Temperature should be at 150°C and the sulfide gas well diluted to avoid any explosion.

At 200 to 300°C, PF will oxidize HCl to chlorine in the gaseous phase.

In aqueous solution, many inorganic ions are oxidized to higher valences. Nitrite, sulfite, and cyanide ions, for example, are converted to the nitrate, sulfate, and cyanate.

Many organics, such as mercaptans, aldehydes, and nitrogen-containing compounds, react with PF. In vapor phase at 250 to 350°C, nearly all organics are oxidized to give acidic products and aldehydes or both. In some cases, the reaction may be explosive.

Fluorination — The PF molecule can react with certain organics by substituting fluorine for "replaceable hydrogen" atoms. This requires alkaline reagents to initiate the reaction.

Perchlorylation — With many aromatics, and in presence of an $AlCl_3$ catalyst, PF yields novel compounds containing the $-ClO_3$ group. The bond is through the chlorine atom, not through the oxygens. In performing these reactions, extreme caution is advised as Cl_2O_6, an explosive gas, and other unstable organic compounds might be formed.

Alkoxides react readily with PF in inert solvents, giving corresponding inorganic esters. These react further with alkoxides to form the corresponding ethers.

Physical Properties

Perchloryl fluoride is supplied in developmental amounts, and its tentative specs are 98% (by wt) purity, 2% inerts, and 0.02% moisture. Boiling at −47°C, it is

easily stored and handled as a liquid at room temperature. Maximum recommended storage temperature is 130°F.

From infrared vibrational, rotational, and micro-wave spectra, it is concluded that PF has a tetrahedral structure about the central chlorine atom, and that the fluorine atom is bonded directly to the chlorine. This configuration gives the compound a marked stability to mechanical shock.

Anhydrous PF is thermally stable up to 500°C, and won't corrode common metals. It is more stable than the acid fluorides in its hydrolytic characteristics, resembling sulfuryl fluoride.

In sealed tube reactions at 250 to 300°C, water has little effect on PF, giving a slow rate of hydrolysis. Concentrated alkali metal hydroxides give quantitative hydrolysis to the perchlorate and fluoride ions.

Alcoholic potassium hydroxide causes rapid hydrolysis at 25°C. Some metals appear to catalyze hydrolysis. Toxicity is about the same as chlorine, but without its irritating action. Similar safety precautions should be taken.

Present price in lab-scale cylinders is $25 a pound, but as production increases, price will be reduced significantly.

(Perchloryl fluoride is a product of Pennsalt Chemicals Corp., Three Penn Center, Philadelphia 3, Pa.)

Check 2992 opposite last page.

"How long have you been in love with this so-called beautiful hunk of machinery?"

for exacting production schedules . . .

MATHIESON POLYETHYLENE GLYCOLS

Poly-G 200, 300, 400 and 600 are clear, odorless, viscous liquids which are soluble in water, acetone, ethanol, ethyl acetate and toluene. Poly-G 1000, 1500 and B1530 are white waxy materials having slightly less water solubility than the lower members of the series. The Poly-G's are produced to meet the most exacting requirements . . . delivered directly by our own fast-moving fleet of tank cars and tank trucks . . . stocked locally, in resin-lined drums, by Mathieson distributors in key industrial areas.

Technical assistance is also available, to help with your specific problems. Contact your local representative for complete information or write today.

Ethylene Oxide	Polyamines
Ethylene Glycol	Ethanolamines
Ethylene Diamine	Dichloroethylether
Diethylene Glycol	Ethylene Dichloride
Triethylene Glycol	Surfactants (Poly-Tergents)
Polyethylene Glycols (Poly-G's)	Glycol Ether Solvents (Poly-Solv's)

Poly-G, Poly-Solv and Poly-Tergent are registered trademarks

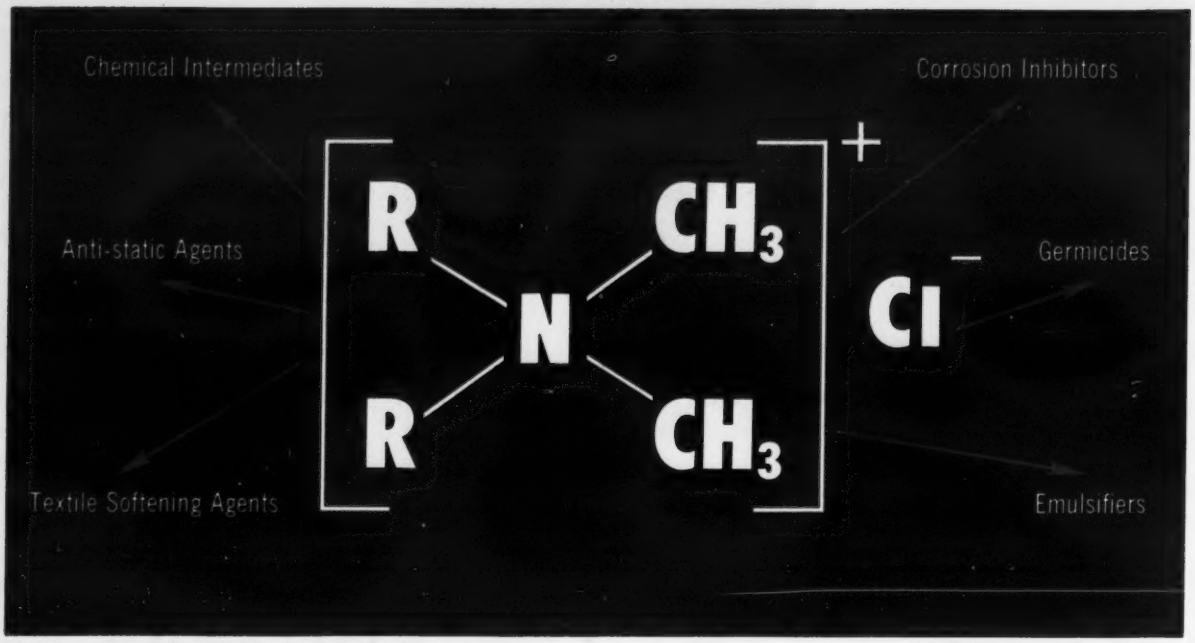
ORGANIC CHEMICALS DIVISION

OLIN MATHIESON CHEMICAL CORPORATION
ONE PARK AVENUE, NEW YORK 16, NEW YORK

5633

Check 2993 opposite last page.

interested in quaternary chemistry?



who knows what men with ideas will do with General Mills

fatty quaternary ammonium chlorides

Some of the better known, common industrial uses for General Mills fatty quaternary ammonium chlorides—our trade name, *Aliquats*—are listed above. *Creative chemists are continuing to look for new uses.* Unique characteristics of these cationic chemicals suggest many applications—one or more of which you may be able to use profitably in your operations!

General Mills fatty quaternaries have strong cationic surface activity. They are stable in both acidic and alkaline media and exhibit excellent antistatic and germicide properties.

Aliquats contain the polar nitrogen grouping and long, non-polar hydrocarbon chains. The cationic nature of the Aliquats effects their adsorption on a variety of surfaces, thus imparting a hydrophobic film of superior integrity on the surface of the material thus treated.

Fatty quaternaries are always "on tap" from General Mills, basic producer of fatty acids. Enlarged plant facilities enable us to give even faster delivery of uniform, quality quaternaries.

SPECIFICATIONS

Product	Trade Name	% Quaternary Ammonia Compound	% Sodium Chloride	pH
Lauryl trimethyl ammonium chloride	Aliquat 4	48-52	1.0 max.	9 max.
Palmityltrimethyl ammonium chloride	Aliquat 6	48-52	1.0 max.	9 max.
Coco trimethyl ammonium chloride	Aliquat 21	48-52	1.0 max.	9 max.
Monotallow trimethyl ammonium chloride	Aliquat 26	48-52	1.0 max.	9 max.
Dicoco dimethyl ammonium chloride	Aliquat 221	73-77	0.5 max.	9 max.
Dihydrogenated tallow dimethyl ammonium chloride	Aliquat H226	73-77	0.5 max.	9 max.
1:1 mixture Aliquats 26 and 221	Aliquat 400	48-52	1.0 max.	9 max.

FOR MORE INFORMATION, write

CHEMICAL DIVISION

KANKAKEE, ILLINOIS

General Mills

District Offices: ***New York,*** *156 William St.* • ***Chicago,*** *460 So. N.W. Hy., Park Ridge, Ill.*

Producers of: Sterols • Fatty Nitrogens • Versamid Polyamide Resins • Fatty Acids • Methyl Esters of Fatty Acids

Check 2994 opposite last page.

When spread, adhesive gives strong bond, sets in seconds

Liquid bonds many surfaces, has ½- to 1-year shelf life

Uses: Strictly experimental so far, this liquid adhesive has been found to give strong bonds between almost every kind of material: wood, metals, rubbers, leather, porcelain, cardboard, and plastics.

Features: Biggest feature of this material is its unique combination of rapid set-time and high strength.

For example, if **one** drop of the liquid is placed on the end of a 2-inch steel rod, and the end of a similar rod is pressed against it for a few seconds (see photo), within

five minutes, the bond will easily support a 200-lb weight. Within 30 minutes, it will hold a 5000-lb weight. If the joint is allowed to set for 48 hours, it will hold 15,000 lb.

Description: Adhesive is a cyanoacrylate monomer modified with a thickening agent and plasticizer. It is available in one ounce to 2 lb quantities.

As far as specific properties of this adhesive, the tensile strength of a steel-to-steel bond is about 2005 psi after two hours at room temp, and 5030 psi after 48 hours. After 9 weeks, strength is 5810 psi.

Bond strength is not adversely affected by temperatures between −17 and 85°C. Short exposures (up to 24 hr)

as high as 100°C won't greatly affect the bond.

In general, the bond has good solvent resistance. Alcohol, benzene, or acetone for periods as long as 24 hr do not greatly affect the bond. Weak alkaline solutions weaken the bond considerably, and weak acids to a lesser extent. Water at temp up to 75°C weakens the bond somewhat, but steam or high humidities cause breakdown of the bond.

With proper care, normal shelf life is between 6 months and one year. Exposure to moisture rapidly decreases the useful life. It is sufficiently basic to cause solidification.

A basic catalyst is available that will give an almost instantaneous bond. This might be useful in bonding surfaces that are acidic in nature, such as acid-washed metals, or bonding irregular surfaces.

A mild lachrymator, adhesive should be kept away from eyes and other mucous membranes. It is relatively non-toxic. If spilled on skin or clothing, it forms a thin coat of solid that's very difficult to remove.

Price of the adhesive is $5 for a one ounce sample. It is under very limited production.

(Eastman 910 Adhesive is a product of Eastman Chemical Products, Inc., Kingsport, Tennessee.)

Check 2995 opposite last page.

Makes PVAc emulsion that's highly water-resistant

Polymerization doesn't require addition of emulsifiers

Uses: As copolymer emulsion in making water-based paints.

Features: Paints made from this emulsion are almost completely resistant to water spotting. Wet adhesion characteristics and resistance to wet rub-off have been improved.

By using these emulsions, formulators may select wide variety of wetting systems. Emulsions are very compat-

SNOW JOB.....

By Snow Generator or By Direct Injection,
The Liquiflow CO_2 System Insures

ABSOLUTE PRODUCT TEMPERATURE CONTROL IN PULVERIZATION

- Assures the uniform refrigeration required in size reduction on chemicals, resins, plastics, pharmaceutical products, antibiotics, sugar, spices and heat sensitive products.
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- Milling capacity is greatly increased by use of Liquiflow (liquid CO_2 system).

HOW WILL CO_2 HELP YOU MOST?

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DIVISION OF GENERAL DYNAMICS CORPORATION

3124 S. Kedzie Avenue
Chicago 23, Illinois

Check 2996 opposite last page.

ible and provide improved pigment binding power.

Descriptions: Polyvinyl acetate polymers and copolymers are manufactured without the addition of protective colloids or emulsifiers, as are conventional PVAc polymers. As these products now contain practically no water-soluble leachable components, they will make paints that have substantially reduced water sensitivity problems.

Emulsion presently available has 50 to 52% total solids, a pH of 4 to 5, viscosity of 20 to 100 cps, and a 0.2 to 0.4 micron particle size. Free monomer is 1%. Emulsion has a negative particle charge, weighs 9.0 lb/gal, and is borax compatible. Final film has high gloss, excellent clarity, water-white color, and no odor or taste.

Manufacturing process has been dubbed "the 'Q' process." One of manufacturer's representatives at the recent Paint Show said that this name was chosen because it was on page 'Q' of their laboratory record book when they finally hit on the optimum manufacturing process.

(Darex Everflex 26980 is a product of Dewey and Almy Chemical Co., Div. of W. R. Grace & Co., 62 Whittemore Ave., Cambridge 40, Mass.)

Check 2997 opposite last page.

High strength at high heat, good thermal stability, with silicone resin

Uses: For bonding low-pressure structural laminates.

Features: Material imparts to glass cloth favorable drape and handling characteristics usually associated with polyesters. It provides high strength at elevated temperatures, excellent thermal stability, and low dielectric losses.

Description: Silicone resin is available in commercial quantities.

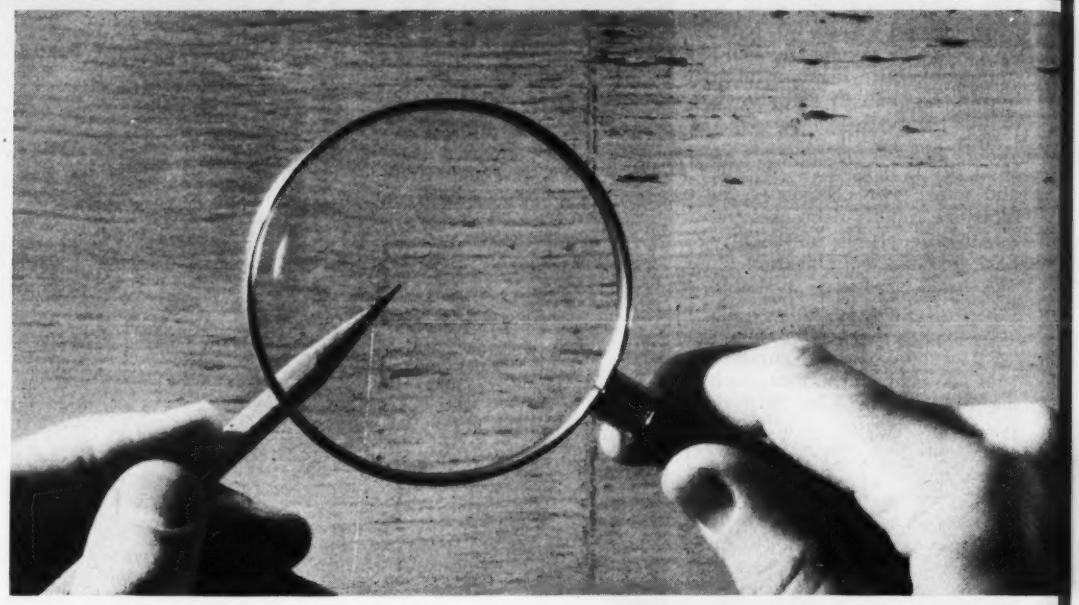
(R-7141 silicone resin is product of Dow Corning Corp., Midland, Mich.)

Check 2998 opposite last page.

MIN CHEMISTRY at work

...news briefs

ON THE CREATIVE USE OF M & C PROCESS MATERIALS



* **Outside House Paints** get new, high-value extender pigments

Focusing six years work, ASP's—M & C Aluminum Silicate Pigments—show same solid acceptance in outside house paints they've enjoyed for years in interior coatings. *Test Fence Proved:* excellent exposure rating for general appearance, gloss, chalking, checking, cracking, dirt collection, mildew, flaking. *Documented:* 12 properties of ASP's that give a score of advantages (including lowest costs) to manufacturers and users of outside house paints. This item is "starred" on the coupon. Check it.

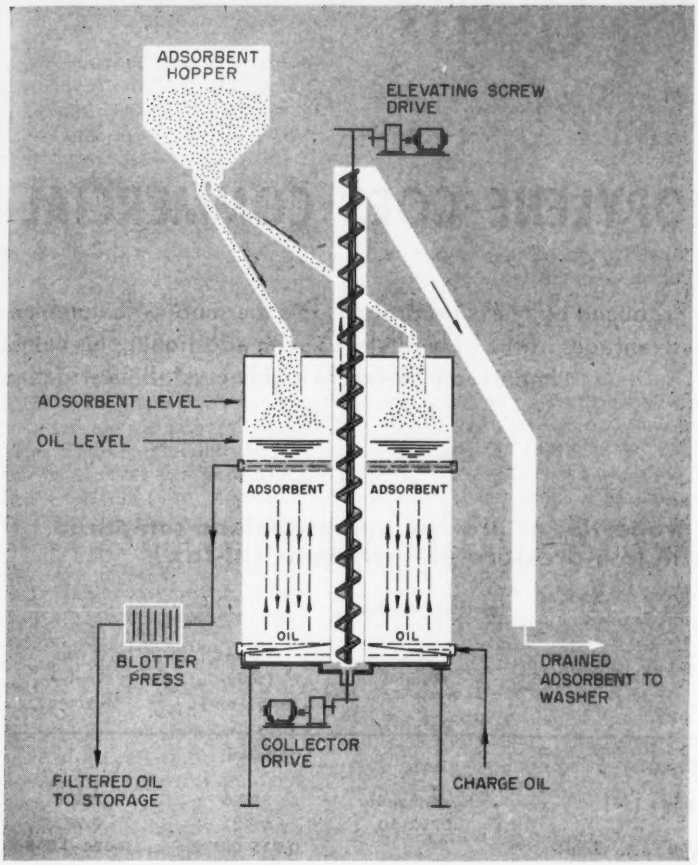
* **New Laboratory Animal Bedding** sets record in sanitation, low cost

One of M & C's newest products is Sterolit—a highly-sorptive, self-sanitizing, odor-killing animal bedding. In a test conducted at National Institutes of Health, in comparison to sawdust in a 3-cage-rack room, Sterolit saved $9.84 a week per room in material and labor. This item is "starred" on the coupon. Check it.

MINERALS &

CORPORATION OF AMERICA

Leaders in creative use of non-metallic minerals



USDA PHOTO

Agricultural Chemists get big assist from granular carrier

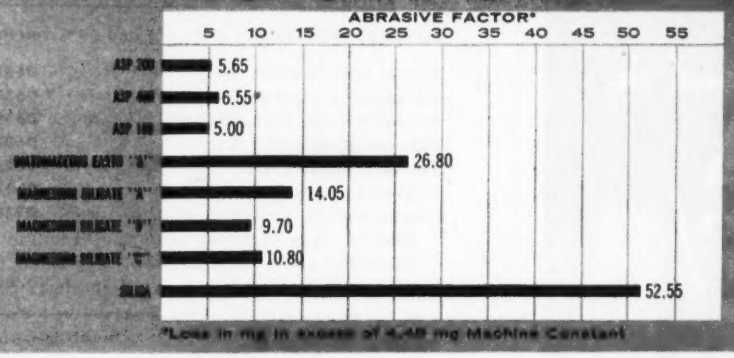
The Imported Fire Ant destroys food, forage and forest . . . attacks livestock . . . even bends mower bars with the tough crust of his mounded colony. Now in the South, he could spread rapidly. M & C—leader in the field of carriers and diluents for control poisons—teamed with toxicant people, came up with granular products to control this marauder.

Continuous Percolation . . . new tool for liquid adsorption / purification processes

Decolorization, purification, and finish-refining take a long stride away from the old batch treatments. With M & C's new patented continuous process, low capital costs, lower operating costs, and up to one-fifth greater yield of improved products per unit of adsorbent may be achieved. Low-cost, reactivatable adsorbents are used in a *continuous* system.

Ink Makers turn to ASP extenders for best grinding and printing behavior

Chart shows results of an abrasion test (details on request). As shown, low-abrasion ASP's promote high grinding speeds, low machine wear, superb "softness" and finish for the printer. ASP's offer half a dozen more pluses, too . . . one of which is low cost.



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✓ your product interest . . .

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For more data, see Chemical Materials Catalog Pages 358-362

CHEMICALS

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Please send, without obligation:

☐ data; ☐ samples; ☐ prices; ☐ technical representative

name_____

title_____

company_____

address_____

city_____ zone_____ state_____

Check 2999 opposite last page.

Film-forming acrylic emulsion produces hard finishes

Can modify softer emulsions to increase their hardness

Uses: In making water-thinned coatings.

Features: Film-forming acrylic emulsion produces hard, tough, clear, continuous films when dried at elevated temperature. It can be used to modify softer acrylic emulsions to produce clear or lightly pigmented films of intermediate hardness, good gloss, and block resistance. It can also reduce their film-forming temperature.

It is also expected that this emulsion polymer will be compatible with many other latex and emulsion types.

Description: Acrylic emulsion Rhoplex C-72 is supplied in 45% solids with pH of 7.5 to 9, and max particle size of 0.5 micron.

Emulsion is nonionic, is not affected by multivalent cations, and is mechanically stable.

On non-porous substrates, unmodified emulsion will form a film at about 39°C, with a Tukon hardness of 4.3.

(Rhoplex C-72 is a product of Resinous Products Div., Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.)

Check 3000 opposite last page.

Highly reactive pyridine serves as ready source for many derivatives

Uses: For a large variety of reactions and development of many commercial materials.

Features: Material is exceptionally reactive.

Description: Pyridine N-oxide is pale yellow, hygroscopic crystalline solid of extremely high purity. It has an mw of 95.10, and melts at 64°C.

(Pyridine N-oxide is available in commercial quantities from Beacon Chemical Industries, Inc., 33-51 Richdale Ave., Cambridge 40, Mass.)

Check 3001 opposite last page.

"NOSEY" says:

I'M CONVINCED, the best bad-odor eliminator yet to be developed is versatile, low cost, ever-so-widely used NEUTROLEUM.* This exclusive FRITZSCHE deodorizing specialty has been employed successfully to mask unpleasant odors for more totally different products than you'd imagine possible. Waxes, textiles, fuel oil, polishes, rubber, printing ink, paints, plastics, adhesives, fertilizers . . . these are but a few of the products that have been benefitted by its use. So my advice is, if you've got any odor problem, ask about and sample NEUTROLEUM first!

*Reg. Trade Mark

FRITZSCHE Brothers, Inc.

Est. 1871

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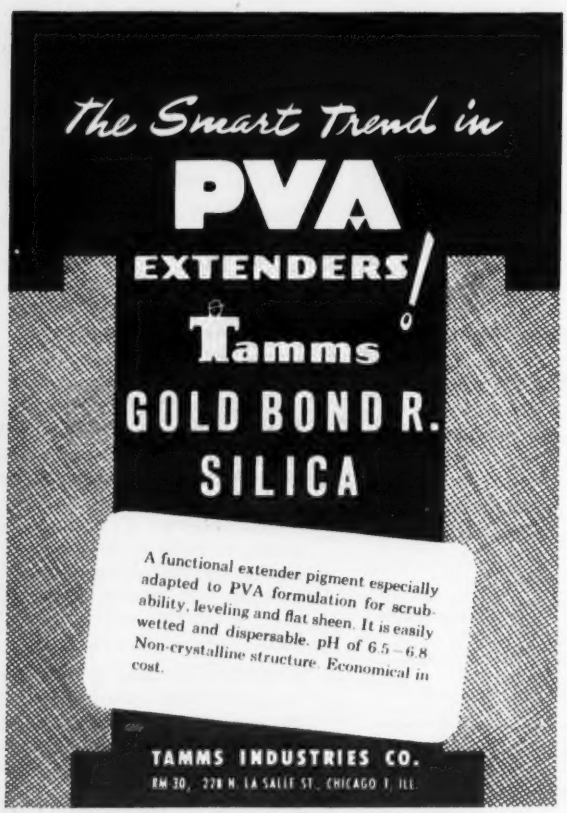
BRANCH OFFICES and *STOCKS: Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, O., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

Check 3002 opposite last page.


The Smart Trend in
PVA
EXTENDERS!
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GOLD BOND R.
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A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersable. pH of 6.5 – 6.8. Non-crystalline structure. Economical in cost.
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Check 3003 opposite last page.

POLYPROPYLENE GOES COMMERCIAL

Produced by Hercules process, this thermoplastic combines all the advantages of the polyethylenes, with additional plus values imparted by its more highly crystalline structure

Physical properties of pro-fax polypropylene compared with low-pressure polyethylene (hi-fax)

	ASTM Method	Pro-fax (polypropylene)	Hi-fax (polyethylene)
		Injection Molded	
GENERAL PROPERTIES			
Crystalline melting point (°F)	birefringence	332.6	267.8
Specific gravity	D792-50	0.901	0.945
Mold shrinkage (% at room temp)		0.015-0.020	0.026-0.045
Molecular weight (average)		250,000-450,000	185,000-250,000
PHYSICAL PROPERTIES (@ 73.4°F and 50% relative humidity)			
Tensile yield strength (psi)	D638-52T*	4970	4000
Elongation at yield (%)	D638-52T*	15	20
Tensile ultimate strength (psi)	D638-52T*	5000	3400
Ultimate elongation (%)	D638-52T*	>220	100-700
Tensile modulus (psi)	D638-52T*	155,000	105,000
Stiffness in flexure (psi)	D747-50	170,000	115,000
Impact strength — Izod	D256-54T		
Notched (ft-lb/in notch)		1.02	1.7-4.9
Unnotched (ft-lb/in)		>17	32
Hardness (Rockwell R scale)	D785-51	93	35
THERMAL PROPERTIES			
Heat distortion temp (°F @ 66 psi)	D648-45T	221	143.6
Deformation under load (%)			
(2000 lb, 6 hr, 122°F)	D621-51	2.0	10
Yield stress @ 212°F (psi)	D638-52T*	1720	
ELECTRICAL PROPERTIES			
Dielectric constant (10^3-10^6 cy)	D149-55T	2.0	2.33
Power factor (10^3 cy)	D150-54T	0.0003	0.0003
ENVIRONMENTAL PROPERTIES			
Water absorption (%)	D570-54T	0.03	0.03
Environmental stress cracking (100% Igepal CA-630)		none	3 to 5 days

* 0.2 in/min cross-head speed

By starting with propylene instead of ethylene, and using a similar type of low-temperature and low-pressure polymerization technique with a metal alkyl catalyst, an insoluble high molecular weight polymer — polypropylene — is produced.

'Pro-fax'

Polypropylene — tradenamed "Pro-fax" by manufacturer — has relatively low cost and low density, yet combines near-spectacular physical properties. Its processing characteristics are excellent. Easily made are compression- and injection-molded products (pipe, bottles, automotive parts, laboratory ware, industrial products) and extruded sheets and films.

Moldability is excellent over a broad range of temperatures and conditions. Good flow characteristics mean die cavities fill quickly. Complex shapes retain their form after cooling, with a minimum of shrinkage and distortion. Parts can be produced in existing molds without modifications of the die or processing techniques, and in fast cycles.

One big advantage is that films are very clear — almost equal to the clarity of cellophane — and have about a 50% lower rate of gas and vapor transmission than conventional polyethylenes.

Water resistant — chemically inert

In addition to high tensile strength, hardness, and rigidity, Pro-fax has high water resistance and is chemically inert — especially to grease, oil, and many common acids.

Product is supplied as ⅛-inch diameter granules in a broad color range. It is suitable for dry coloring.

Cost is 65c a pound at present, in commercial quantities. Price should drop to 2/3 this figure as volume increases.

(Pro-fax is a product of Cellulose Products Dept., Hercules Powder Co., Wilmington 99, Del.)

Check 3004 opposite last page.

HIGH PURITY RARE EARTHS

Available in quantities at surprisingly low cost

a report by LINDSAY

A few months ago, in one of these reports, we presented this table of high purity rare earth and yttrium oxides. We anticipated inquiries, of course, but the flood of letters requesting detailed information really startled us.

What interests us particularly, and will you, is the fact that so many research people are intrigued with the practical possibilities of these unique materials. The large amount of research now being done on high purity rare earth oxides in a wide variety of industries encourages us to suggest the likelihood that they may offer you opportunities for potentially profitable investigation.

Already, in a little more than two years since rare earths in purities up to 99.99% became available in commercial quantities, they are being used as basic production materials in many chemical and industrial operations.

Production Up—Costs Down

We have expanded our production facilities to keep up with demand and now have more than 100 ion exchange columns in continuous operation. Quantities are large enough to assure you a dependable source of supply. Prices are low enough to make their use on a production basis economically sound.

Most of the high purity rare earth and yttrium oxides are available for prompt deliveries in quantities of an ounce to hundreds of pounds.

We can't tell you how to use high purity rare earths in your production operations, nor can we promise that one of them may be the missing element in new process or product developments on which you are working. We *can*, however, supply you with data which you will find interesting, revealing and quite possibly of immediate importance to you.

TYPICAL MAXIMUM IMPURITIES IN LINDSAY PURIFIED RARE EARTH AND YTTRIUM OXIDES

ATOMIC NO.	OXIDE	CODE	PURITY	% RARE EARTH MAXIMUM IMPURITIES AS OXIDES
57	La_2O_3. LANTHANUM OXIDE	528 529	99.99 99.997	0.01 Pr, 0.001 Ce. 0.0025 Pr, 0.0005 others
58	CeO_2. CERIC OXIDE	215 216	99.8 99.9	0.2 (largely La + Pr + Nd). 0.1 (largely La + Pr + Nd).
59	Pr_6O_{11}. PRASEODYMIUM OXIDE	726 729.9	99 99.9	1 La + Nd + smaller amounts of Ce and Sm. 0.1 Ce + Nd.
60	Nd_2O_3. NEODYMIUM OXIDE	628 629 629.9	95 99 99.9	1-4 Pr, 1-4 Sm, 0.5-1 others. 0.1-0.4 Pr + 0.1-0.4 Sm + 0.5 others. 0.1 (largely Pr + Sm).
62	Sm_2O_3. SAMARIUM OXIDE	822 823	99 99.9	0.2-0.7 Gd, 0.2-0.6 Eu, and smaller amounts of others. 0.1 (largely Nd + Gd + Eu).
63	Eu_2O_3. EUROPIUM OXIDE	1012 1011	98-99 99.8	1-2 Sm + smaller amounts of Nd + Gd + others. 0.2 (largely Sm + Gd + Nd).
64	Gd_2O_3. GADOLINIUM OXIDE	928.9 929.9	99 99.9	1 Sm + Eu + trace Tb. 0.1 Sm + Eu + trace Tb.
65	Tb_4O_7. TERBIUM OXIDE	1803 1805	99 99.9	1 Gd + Dy + Y. 0.1 Gd + Dy + Y.
66	Dy_2O_3. DYSPROSIUM OXIDE	1703 1705	99 99.9	1 (largely Ho + Y + Tb + small amounts of others). 0.1 Ho + Y + traces of others.
67	Ho_2O_3. HOLMIUM OXIDE	1603 1605	99 99.9	1 (largely Er + Dy + small amounts of others). 0.1 Er + Dy + traces of others.
68	Er_2O_3. ERBIUM OXIDE	1303 1305	99 99.9	1 Ho + Dy + traces Yb and Y. 0.1 Ho + Tm.
69	Tm_2O_3. THULIUM OXIDE	1405 1403	99.9 99	0.1 Er + Yb + trace Lu. 1 Er + Yb + trace Lu
70	Yb_2O_3. YTTERBIUM OXIDE	1201 1202	99 99.9	1 Er + Tm + trace Lu. 0.1 Tm + trace Lu + Er.
71	Lu_2O_3. LUTETIUM OXIDE	1503 1505	99 99.9	1 Yb + Tm + traces of others. 0.1 Yb + Tm + traces of others.
39	Y_2O_3. YTTRIUM OXIDE	1112 1115 1116	99 99.9 99.9+	1 Dy + Gd + traces Tb and others. 0.1 Dy + Gd + traces Tb Approx. 0.05 Dy + Gd.

For detailed information and prices, write for our bulletin "Purified Rare Earth and Yttrium Oxides"

PLEASE ADDRESS INQUIRIES TO:

LINDSAY CHEMICAL COMPANY

World's Largest Producer of Thorium and Rare Earth Chemicals

288 ANN STREET • WEST CHICAGO, ILLINOIS

Check 3005 opposite last page.

What Can You Do With These Startling New Chemical Building Blocks?

ADM's alpha olefins have created excitement in so many different areas that these highly reactive chemicals almost sound like a cure-all remedy. They aren't, of course. But they are startling new building blocks, both for chemical intermediates and as reactants to modify existing products.

Even though alpha olefins have been around long enough to get into commercial production, many people still haven't had a chance to get acquainted with them. A few more words in their behalf seem timely and proper.

Areas Of Usefulness

Consider alpha olefins if you are involved in viscosity index improvers, pour-point depressants, detergents, lead scavengers, leather treating, textile and paper chemicals, adhesives, plastics, polymers, or protective coatings . . . just to name a few. These are listed just to hint at areas in which alpha olefins have shown promise and can profitably stand further investigation.

Here's Why

Straight-chain C_{12} to C_{22} olefins with the unsaturation between the 1 and 2 carbon atoms come from the dehydration of purified fatty alcohols of known composition and chain length. They attain final purities better than 90%. These slender, straight molecules have remarkable metal-wetting properties. They form completely different products than olefins with side chains previously available. They generally react smoothly because of their known structure. When reacted, their derivatives are more stable against oxidation than those of the branched chain (petroleum-derived) olefins. They resist break-down under shear or moderately high temperatures.

There's much more you should know about alpha olefins. Write us. We can send literature, data sheets . . . perhaps even a sample to evaluate.

Now In Commercial Production!

Archer-Daniels-Midland

CHEMICAL PRODUCTS DIVISION

742 Investors Building, Minneapolis, Minnesota

Chemifats from Nature's Wondrous Warehouse

Check 3006 opposite last page.

CHEMICAL MATERIALS

Low-temp plasticizer for vinyls

Possesses higher efficiency, greater compatibility

Uses: Low-temp plasticizer for vinyls.

Features: Compared to adipates, product offers better low-temp flexibility, possesses higher efficiency, substantially greater compatibility. Product imparts higher tensile strengths at efficiency concentration, lower oil extraction, and appreciably lower volatility.

Description: Tentative specs are:

Acid no. (mg KOH/gm, max)	1.0
Color (APHA, max)	75

(Plastolein 9078 LT Plasticizer is product of Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati 2, Ohio.)

Check 3007 opposite last page.

Disperses pigments in water systems — stops discoloration

Agent has wide stability over pH range

Uses: As dispersing agent designed to meet needs in paint and paper industries.

Features: Agent has minimum foaming tendencies and low viscosity. It is said to be particularly effective for dispersing pigments in water systems, and for use where freedom from eventual discoloration is important. Small amounts will produce fluid pigment dispersions. Stability over wide pH range is exhibited.

Description: Dispersing agent is clear and colorless liquid. Physical properties:

Percent solids	25±1
Sp gr (@ 25°C)	1.16
(max cps @ 25°C)	75
pH	9.5 - 10.5
Viscosity	

(Daxad 30 is product of Dewey and Almy Chemical Co., Div. of W. R. Grace & Co., 62 Whittemore Ave., Cambridge 40, Massachusetts.)

Check 3008 opposite last page.

Don't Let The Odor Imp Menace Your SALES EFFORTS!

DEODALL®#1 has proved effective in commercial practice for masking solvent odors and the unpleasant scent of other petroleum products. *Deodall #1* gives high performance at *low* cost in a wide variety of applications. Why not send us a sample of your product for laboratory study and recommendations.

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Industrial Aromatics and Chemicals
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Check 3009 opposite last page.

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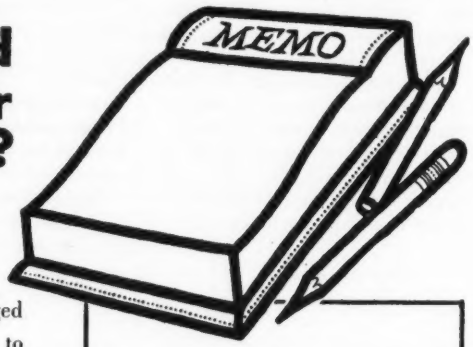

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Present Company .....

Main Product .....

Rating of Company .....

Street Address .....

City ..... Zone No. ..... State .....

Antiseptic coating first effective one on market

Cost is about 8c per sq ft for one mil-thick coating

Uses: As antiseptic coating material for objects which are handled by public but seldom washed (telephone handsets, toilet seats, flush levers, banisters, sterile containers, tin can tops, door knobs, bank pen handles, and money). It is also applicable to many items for personal use such as inhaler nosepieces, combs, tooth brushes, children's toys, and furniture.

Features: Solution provides first effective antiseptic coating on market. Cost is about 8c per sq ft for a one mil-thick coating.

Description: Product consists of hydrophilic methanol-formaldehyde-nylon polymer containing 5-10% by weight of an active antiseptic (iodine). These materials are soluble in 70:30 isopropanol-water. Desirable solids content depends on method of application — about 3-4% solids for spraying, 5-10% for painting or dipping. Coating should be cross-linked for best results. Do this by heating at 90-140°C with suitable catalyst.

(Sterilon is product of White Chemical Co., 1505 Capitol Ave., Bridgeport 4, Conn.)

Check 3010 opposite last page.

FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

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ALLIED CHEMICAL & DYE CORPORATION

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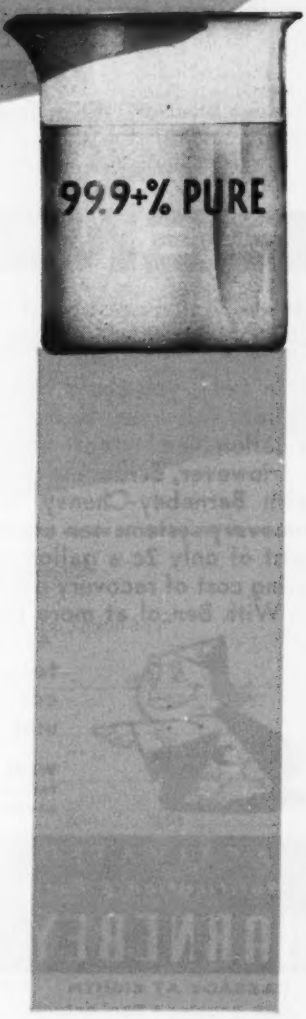

We should know all there is to know about making aniline — we've been a leading producer since 1884. Today, we are delivering a clearer, purer product than ever produced before. It's 99.9+% pure, water-white and exceptionally uniform. Car after car exceeds A.C.S. specifications for C.P. aniline!

Our recently-doubled continuous plant at Moundsville, W. Va. (just south of Wheeling) assures you of the quantity you need and the purity you want . . . with fast delivery by rail, truck or inland waterway.

We will be pleased to furnish samples, specifications, price and delivery quotation.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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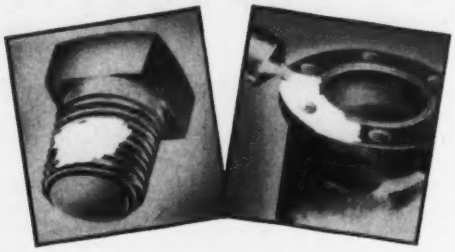
Allied Chemical

Check 3011 opposite last page.

The answer to those difficult
LEAKING-JOINT Problems



The tough, clinging film of Leak Lock stretches rather than breaks

Leak Lock holds chemical solutions, gases, oils, gasoline and refrigerants that would eat through ordinary joint compounds. It has extraordinary adhesion and remains flexible indefinitely.

During the past eight years Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other fields in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

HIGHSIDE CHEMICALS INCORPORATED
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Send for FREE SAMPLE on your business letterhead

Leak Lock

Check 3012 opposite last page.

BENZOL

has more than doubled in price —but not if you have Solvent Recovery

In 1941, you could buy Benzol for 15c a gallon. This year, Benzol hit a high of 36c a gallon—an increase of 140%.

However, Benzol users who are equipped with Barnebey-Cheney automatic solvent recovery systems can use and re-use it at a cost of only 2c a gallon—the direct operating cost of recovery equipment.

With Benzol at more than 2½ times the '41 price, the importance of solvent recovery to a quantity user is very apparent.

WRITE TODAY for our free technical bulletin W-21, on recovery and re-use of Benzol.

ACTIVATED CARBON
Purification & Recovery Equipment
BARNEBEY-CHENEY

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Check 3013 opposite last page.

Yearly meeting of paint and varnish clubs: One big interchange of materials and equipment know-how

Photos by CP Staff

Annual get-together reveals trends, techniques, materials for the paint industry

THE last two days of October and the first two of November were pretty hectic in historic Philadelphia.

Many hundreds of technical and sales people from more than 90 major material and equipment suppliers, and hundreds more technical men from coating manufacturing companies traded notes and ideas, learned what was new and what was needed in materials, equipment, and methods for this industry which now is selling over 1½ billion dollars of coatings each year.

The occasion was the 35th annual meeting of the Federation of Paint and Varnish Production Clubs, held at Philadelphia's Bellevue-Stratford Hotel.

Latex Emulsion Coatings Still Rocketing Ahead

One fact was very clear to anyone attending the meeting. Latex emulsion paints are going to take over more and more of the trade sales portion of the industry. To look over the percentage of companies selling products for water-thinned paints, one would believe that these paints represent far more than about 10% of the present sales volume of the industry.

There is increased pressure on coating manufacturers and suppliers to come up with water-thinned exterior and industrial coatings — specifically, good glossy coatings for finishing of automobiles.

One supplier said that the Ford Motor Company wants to be using such a finish on their cars in the next two years. (Right now, Ford is using water-thinned undercoat — lack of fire hazard and increased production economies are spurring the change.) He felt that two years would be pushing the development too fast, but that the problem will be licked within ten years at the most.

All manufacturers — vinyl, acrylic, urethane, alkyd, and butadiene/styrene latices — are introducing further improvements in their products, for use in water-thinned paints.

Butadiene/styrene manufacturers are combating any inroads by competitive materials by developing latices that give improved properties, such as water resistance.

It looks as though the entire industry is gravitating toward some "ideal" that will probably be a combination of the best of all the different types.

Suppliers for solvent-thinned coatings and lacquers were well represented, but the trend is noticeable from year to year that more and more companies are

developing products for use in water-thinned coatings.

The major developments in materials are individually described in this section, both this month and in subsequent issues.

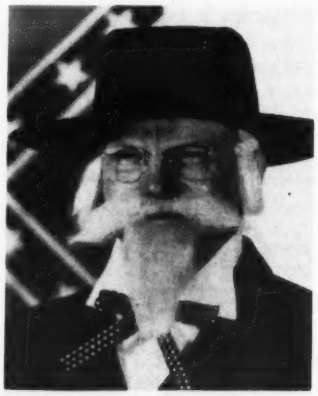
Processing Machinery

As far as new machinery for the industry, the trend is toward high-speed chopper-type dispersion equipment. It seemed that mill manufacturers were exhibiting either especially developed equipment, or modifications of their previously available equipment that permitted use of this principle.

Development of a device for dispersing and grinding operations was described by a Du Pont representative at one of the technical sessions. Called a sand grinder, this device consists of a tank filled with sand. A series of revolving paddles in the tank keep the sand in motion as the material to be ground passes upward. Du Pont has authorized a number of manufacturers to supply the equipment, and will license users on a royalty basis.

Technical Sessions

Other interesting sessions were the material handling panel discussion. Upshot: coat-



W. E. Hood of Industrial Paint Co., Birmingham, Alabama, assumes role of Southern "Colonel" to lead trouble-shooting quiz session in a humorous and interesting manner

Just Published!

The NEW Dicalite Technical Bulletin B-13 is just off the press. Completely revised, this new general handbook on filtration with filteraids has been expanded to 24 pages, illustrated with charts, diagrams and photographs. In addition to its clear discussion of the principles of filtration, Dicalite Bulletin B-13 contains information on the factors involved in filter station layout and design, and a great deal of practical operating data on both pressure and vacuum systems. We will be glad to send you a copy with our compliments.

Dicalite Dept., Great Lakes Carbon Corporation
612 So. Flower St., Los Angeles 17, Calif.

Please send me my free copy of Technical Bulletin B-13

Name_____ Title or Position_____

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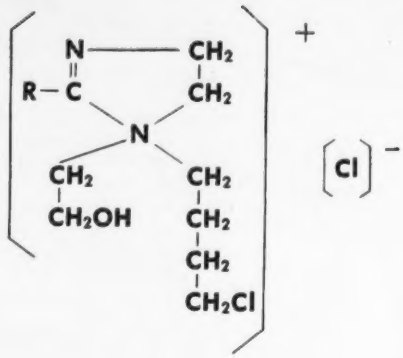
Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

Check 3014 opposite last page.

Nalquats



...have these outstanding advantages among quaternaries

- **Excellent hydrocarbon solubility**
- **Improved bactericidal activity under mildly acid conditions**
- **Freedom from inorganic salts**

the Nalquats... (there are several) are quaternary ammonium chlorides, strongly ionized in water, and have an essentially neutral pH. The long, straight hydrocarbon chain in the cation gives high surface activity, so the Nalquats are effective wetting, foaming and dispersing agents in both water and hydrocarbon systems. They are excellent film-formers, and are strongly adsorbed on many different types of solid surfaces. Their specialized characteristics make them outstanding emulsifiers and excellent corrosion inhibitors.

Write for technical data on Nalquats . . . we will be glad to send samples of those you find interesting.

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Nalco® PRODUCTS

. . . Serving World Industry through Practical Applied Science

Check 3015 opposite last page.

ings manufacturers should work hard to develop bulk handling, automatic filling, labeling, warehousing, and order filling setups to cut unit costs.

W. E. Hood of the Industrial Paint Company in Birmingham, Alabama, has a unique way of leading a technical discussion. In fact, it's become a tradition at each year's meeting.

Decked out as a Southern Colonel of by-gone days, complete with Confederate flag, white mustache and goatee, "Colonel" Hood poses technical questions to his audience — many hundreds who packed into the grand ballroom of the Bellevue-Stratford.

Although designed as a trouble-shooting quiz session for practical processing problems, Hood livens the get-together by popping such questions as "What did Mrs. Whitney say to Eli?" (Answer: "Get your cotton-pickin' hands offn' my gin!")

The keynote address of the four-day meeting, given by Dr. R. H. Lueck, vice president of the American Can Co., transcended any one industry, especially in view of the present scrutiny of American scientific research effort.

Dr. Lueck noted that our rate of growth of research is much greater than the rate of growth of our gross national product, and that our current expenditure is about $7 billion a year. Economically, only about 5% of this investment "pays off," but those projects that do, pay off handsomely.

A major problem in directing research, is to orient and organize the effort in such a way that the research staff maintains the impression that there is no interference with their creative thinking.

The most important decision, Dr. Lueck says, is determining the economic cut-off point — the point at which the time advantage in making a quick choice offsets the danger of making a decision that is not based on knowledge of every last detail. By nature, the scientist wants to learn everything before he makes his decision. It's important to know when the point of di-

spray-dried perfumes perfected by D&O

There is now a simple answer to the difficult problems involved in perfuming *powdered bleaches, dry detergents, soap powders, household* and *specialty cleansers, scouring powders* and other similar products. D&O has applied its own, unique spray-drying technique to perfume oils and compounds with the result that fragrance can now be locked-in . . . just as surely and permanently as flavor. The use of such spray-dried perfumes, vastly increases the shelf-life of the scented product . . . and assures that the fragrance is absolutely intact when it reaches the consumer . . . regardless of storage time. Upon its first contact with water . . . the full, rich perfume is released in all its original strength and depth. D&O has named its new group of locked-in perfumes — "FRAGRANCE-SEAL" — and trial quantities are available in all aromatic types for individual manufacturer testing. Write today.

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Essential Oils • Aromatic Chemicals • Perfume Bases • Flavor Bases • Dry Soluble Seasonings

Check 3016 opposite last page.

minishing return is reached.

What Dr. Lueck says seems very applicable to our satellite research projects. Is the time factor of being *first* with any kind of satellite at all, of greater advantage than to be *second* with a better, more fully researched one? ■

Cuts water evaporation, forms monomolecular surface-film barrier

Product reduces evaporation of water by forming a monomolecular film barrier. Product, combination of fatty alkanols, is said to reduce evaporation as much as 50% under favorable conditions.

It is supplied as five-pound slab together with accessory attachments so that it may be anchored in a definite position on surface of water. The monomolecular film is established automatically by spreading out radially from a slab until confined by a physical barrier — *e.g.*, shoreline or tank edge.

Back-pressure then stops further spreading of material. Remaining portion of slab acts as reserve to repair breaks in film and replenish film that is lost.

Although film is only one ten-millionth of an inch thick, it prevents the escape of water molecules to the atmosphere. It is permeable to oxygen so that aquatic life is undisturbed.

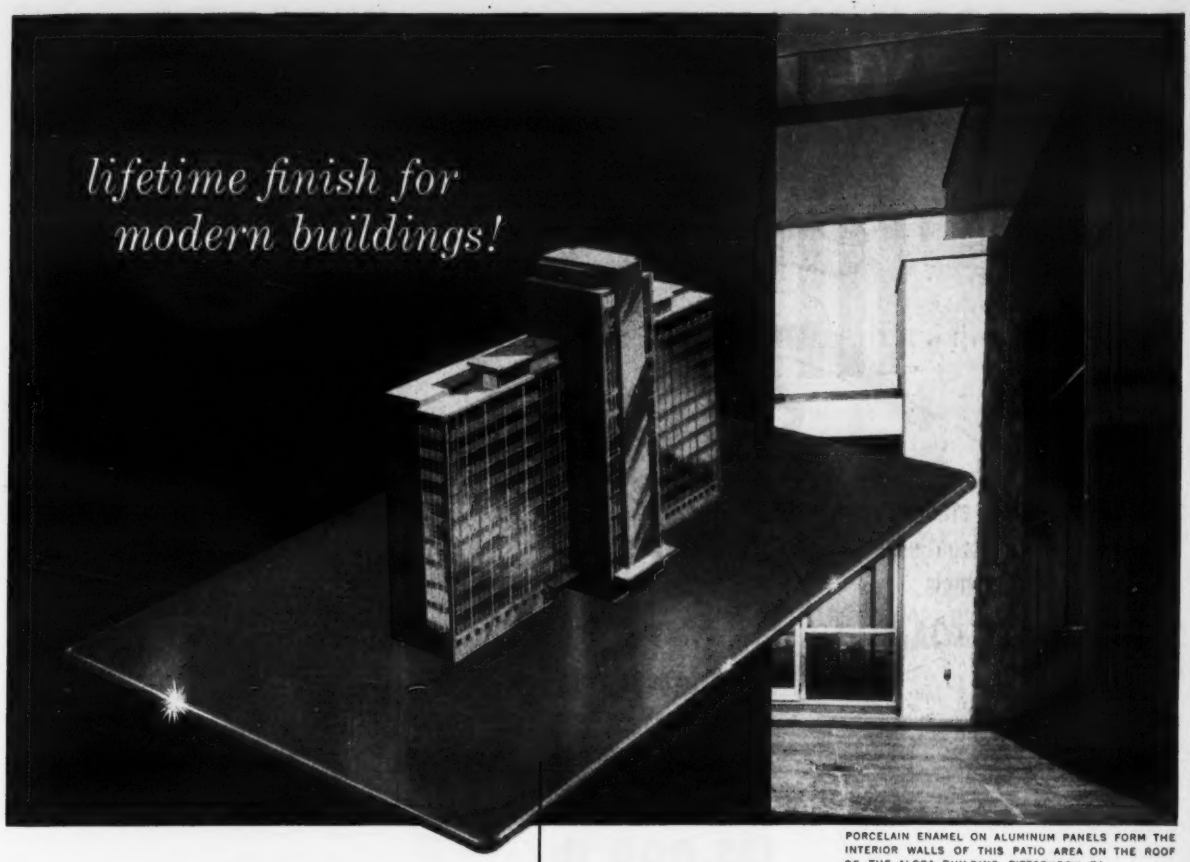
(Siponol EGH is a product of American Alcolac Corp., 3440 Fairfield Rd., Baltimore, Md.)

Check 3017 opposite last page.

Polyethylene processing

File folder incloses two series of tips for molders and extruders of polyethylene to better improve their techniques — 12 pages. "Polyethylene Processing Tips" — US Industrial Chemicals Co., Div. of National Distillers Products Corp., 99 Park Ave., New York 16, N.Y.

Check 3018 opposite last page.



PORCELAIN ENAMEL ON ALUMINUM PANELS FORM THE INTERIOR WALLS OF THIS PATIO AREA ON THE ROOF OF THE ALCOA BUILDING, PITTSBURGH, PA.

Trona®
Lithium
Carbonate

helps make ARCHITECTURAL PORCELAIN ENAMEL hard and beautiful as glass – strong as the base metal

The lifetime finish of porcelain enamel makes it a versatile modern architectural material. Used as a tough, ceramic coating for architectural aluminum, porcelain enamel enables architects and engineers to take full advantage of the lightweight metal for dramatic structural and decorative purposes. It enhances color appeal, durability and ease of fabrication.

TRONA® Lithium Carbonate is used in the manufacture of commercial frit for ceramic coatings. It is a powerful fluxing agent, permitting the frit to melt at lower temperatures and contributing to improved adherence of the coating to the base metal. Li_2CO_3 is an important member of the family of TRONA chemicals designed always to provide the right beginning for end-product quality.

Other Trona chemicals at work in ceramics and glass –
Three Elephant® BORAX
technical, granular and powdered
BORIC ACID
technical
PYROBOR®
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DOW CORNING SILICONE DEFOAMERS

have proved their efficiency and versatility in countless applications. For example:

1 OUNCE KILLS FOAM IN . . .

- **625,000 lb** sodium bromide crystallization solution
- **250,000 lb** molasses, vat dye solution, trioxide pickling solution, tall oil
- **125,000 lb** phenolformaldehyde, urea formaldehyde, asphalt, starch sizing
- **62,500 lb** soft drinks, 70% caustic liquor, black liquor, sulfuric acid pickling bath

Just a few drops of a Dow Corning SILICONE DEFOAMER can prevent mountains of foam . . . enabling you to utilize full productive capacity and put your processing into high gear. What's more, when you control foam, you eliminate the mess and waste of boilovers. Whatever *your* foaming problem, a Dow Corning SILICONE DEFOAMER will help solve it at amazingly low cost.

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Dow Corning CORPORATION
MIDLAND, MICHIGAN

321

NAME

TITLE

COMPANY

CITY ZONE STATE

My foamer is

Oil system

Aqueous system

Food products

Other

Check 3020 opposite last page.

CHEMICAL MATERIALS

Reduces troubles resulting from fine rust particles in aviation fuels

Uses: As a corrosion inhibitor for aviation gasoline and turbine fuels.

Features: Additive brings about reduction of difficulties resulting from presence of fine rust particles in aviation fuels. Inhibitor was formulated to incorporate characteristics defined in the applicable military specs for an aircraft fuel corrosion inhibitor.

Description: Inhibiting action of corrosion preventive is polar in nature. It does not react with metal surfaces it contacts. The inhibitor, wholly petroleum derived, has no metallic elements in its composition. It has been field tested for six years. Dosage is 15 to 20 lb per thousand barrels.

(Aircraft Fuel Inhibitor is a product of The Texas Co., 135 E. 42nd St., New York 17, New York.)

Check 3021 opposite last page.

Industrial sand product has 20% of iron content in conventional sand

Uses: In manufacture of ray-transmitting and optical glasses, this sand supplants Brazilian rock quartz. It is also used in manufacture of fine table and decorative glassware, in production of fused quartz, in preparation of high purity silicates, and in processing of chemicals.

Features: Material can be produced in tonnage quantities to meet specs calling for max of 0.005% iron oxide — about 20% of iron content in first-quality commercial glass sand. Sand is produced domestically at Kona, N.C.

Description: Low-iron sand is lower in cost than imported material. Produced in granular form, sieve analysis is ideal for glass-melting sand.

("Kona Super Sand" is processed by Industrial Minerals Div., International Minerals and Chemical Corp., 20 North Wacker Dr., Chicago 6, Ill.)

Check 3022 opposite last page.

Mono Oleates Di

of

Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine

MADE TO MEET YOUR SPECIFICATIONS

THE FLAME AND THE FLASK — SYMBOL OF QUALITY

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
5147 W. 67th Street, Chicago 38, Illinois
AKRON, OHIO • NEWARK, N. J.
CHICAGO, ILL. • LOS ANGELES, CAL.

Check 3023 opposite last page.

Resin imparts high gloss and good wear quality to floor polishes

Uses: Making both self-polishing and rebuffable floor polishes.

Features: Polish imparts high gloss, good wear and scuff resistance, high water-spot resistance, and package stability to self-polishing formulas. Formulations exhibit fine slip resistance, easy removability, and little or no loss of gloss on aging.

Description: Floor polish resin is based on special vinyl plastic in emulsion form. Formulations are simple to make. They require only the plastic resin, wax emulsion, and leveling surfactant or resin. Plastic resin is compatible with emulsions of carnauba, polyethylene, microcrystalline, and Fischer-Tropsch waxes.

(Resyn 25-2400 is product of Resin Div., National Starch Products Inc., 1700 W. Front St., Plainfield, New Jersey.)

Check 3024 opposite last page.

Impact phenolic premix can be made by users to cut costs

Reinforced phenolic moldings can now be produced at a cost savings by molders who mix their own impact molding materials. Formulas and mixing procedures have been developed.

(Information can be obtained from Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, New York.)

Check 3025 opposite last page.

Lists chemicals

Manufacturer's 1957 catalog of 84 pages lists over 4000 laboratory chemicals. Organic and inorganic chemicals tested in accordance with analysis shown are presented. Product Cat — Matheson Coleman & Bell, Div. of The Matheson Co., Inc., East Rutherford, N.J.

Check 3026 opposite last page.

BRIEFS for buyers of

Caustic Soda

Phosphorus Compounds

Other Chemicals

Chemicals for a growth area

Pulp, petroleum, and plywood are three of the main reasons why industry is popping in western Canada.

Fitting neatly into this growth picture is the new plant of Hooker Chemicals Ltd., in North Vancouver, B. C. The plant, which opened this fall, is Canada's first chlor-alkali producing point west of the Rockies.

By rail and barge, it will supply caustic soda and chlorine for making and bleaching pulp; more caustic soda to help sweeten petroleum refinery products and to produce plywood adhesives.

Hooker customers around Vancouver will enjoy a freight saving on these chemicals, which formerly came into the area by sea-going barge from our Tacoma plant.

Is your supplier growing with you?

In its modest way, this new Hooker plant underscores a point that you may consider important in your own expansion plans.

You have much to gain by tying up with a chemical supplier geared to the spread of industry into new areas; accustomed to anticipating your requirements of tomorrow, even while serving you dependably today.

Close to the major industrial centers of the East, Midwest, and West Coast, Hooker plants and stock points give you quick, dependable service when you need it. All Hooker caustic soda plants and distributing points are on deep water. This makes transportation extremely flexible. It tends to minimize shipping costs, and permits a choice that can make a big difference if an emergency occurs.

And if you buy l/c/l, there's an authorized Hooker distributor nearby, ready to meet your needs for caustic soda and other Hooker chemicals.

If you'd like to see how this flexible, fast-moving supply team can strengthen your position on chemicals, drop us a line and we'll get the facts to you promptly.

New 12-page bulletin lists Hooker products

You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLDBURY® brand names.

Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

If you'd like to have this up-to-date timesaver in your file or on your desk, just check the coupon for a copy of new *Bulletin 100-A.*

Here's data on phosphorus-sulfur compounds

Every time you strike a match, you're helping to justify the market researchers' predictions for one of our OLDBURY Products: red phosphorus.

This fascinating element got off to a commercial start in this country in 1910, on the site of the present OLDBURY Products plant in Niagara Falls.

Today many other items that must burn up before they can do anyone any good are made with OLDBURY *red phosphorus* or *phosphorus sesquisulfide,* P_4S_3. These include matches, fireworks, safety and signal flares, fusees, and smoke screens.

Your product may require another equally useful, though less dramatic, way of putting phosphorus to work:

Phosphorus Pentasulfide, P_4S_{10}. We make it in three particle-size grades of powder, and as a fused solid. Phosphorus content is 27.8% minimum. Powder forms come in lever-pak drums, 150 lbs. net; solid in single-trip steel drums, 215 lbs. net.

These products are available, as always, under the highly reputed OLDBURY label. For more information, we suggest you check the coupon for new technical data sheets just completed.

For more information on chemicals mentioned on this page, check here:

- ☐ Caustic Soda
- ☐ New list of products—Bulletin 100-A
- ☐ Phosphorus, white
- ☐ Phosphorus, red
- ☐ Phosphorus Pentasulfide
- ☐ Phosphorus Sesquisulfide

Clip and mail to us with your name, title, company address. *(When requesting samples, please use business letterhead.)*

HOOKER ELECTROCHEMICAL COMPANY
501 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Niagara Falls Tacoma Montague, Mich. New York Chicago
Los Angeles Philadelphia Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

Check 3027 opposite last page.

Pelletized Tech Grade . . . Crystalline Tech Grade . . . Crystalline Pure Grade . . .

Take your pick of the Celanese Pentaerythritol best suited to your formulation requirements.

You'll want to get acquainted with Tech Grade Celanese P.E. in the new Pelletized form. This revolutionary, new product is available in commercial volume. Field tests indicate that Pelletized P.E. shortens cooking cycles, eliminates dust losses, makes for easier handling.

Take your pick—Pelletized or Crystalline Tech Grade, or Crystalline Pure Grade—and write for samples, technical data, prices. Celanese®

Celanese CHEMICALS

Celanese Corporation of America, Chemical Division, Dept. 591-A, 180 Madison Avenue, New York 16.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16.

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Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

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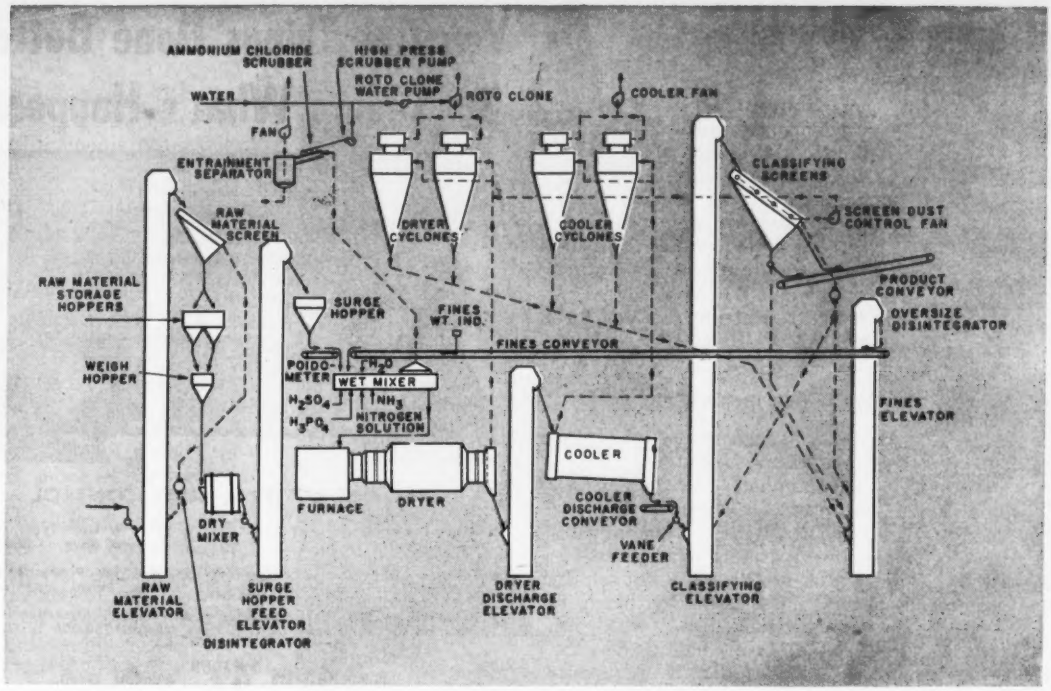
others in your company would like also to receive CHEMICAL PROCESSING personally each month, they may be added to the form opposite the back cover.

Your application for subscription is welcomed.

For more information on product at left, specify 3028 see information request blank opposite last page.



Process is characterized by its ability to produce many types of fertilizer formulations

Davison-Trenton Process
Chemical Analysis, Screen Analysis, and Operating Data
From Plant Production Files

	1	2	3	4
Grade	3-12-12	5-20-20	12-12-12	15-15-15
Plant	Findlay	Trenton	Joplin	Joplin
Production rate, tons/hr.	24	24	36	20
ANALYSES OF PRODUCT				
Chemical				
Nitrogen	3.03	5.06	12.43	14.90
Available P_2O_5	12.25	20.64	12.07	15.22
Insoluble P_2O_5	0.45	0.81	0.48	0.38
Total P_2O_5	12.70	21.45	12.55	15.60
Potash, K_2O	12.74	19.87	12.20	15.30
Moisture	3.03	1.60	1.95	2.55
Screen mesh, fractions				
On 4	0.05	1.38	0.1	
On 5			2.4	1.2
On 6	16.48	13.43	9.8	10.8
On 8	30.33	15.66	28.7	41.70
On 20	51.08	63.85	55.3	44.60
−20	2.06	5.68	3.7	1.90
OPERATING DATA				
Temperatures °F				
Furnace				700
Inlet Air	900			400
Dryer Exhaust		200	230	210
Material Entering Dryer	170	185	180	170
Material Leaving Dryer	195	202	240	180
Cooler Exhaust		150	190	170
Material Leaving Cooler	120	160	196	140
Pile	92	145	170	130

cp IDEAS: from other industries and nuclear field — new trends in research, processes, services

Demand for granular fertilizers with 'eye appeal' is continually going up. Here is an ammoniating and granulating process that has contributed greatly to the success of the industry. Capable of producing a large variety of formulations at a low operating cost, Davison's Trenton Process . . .

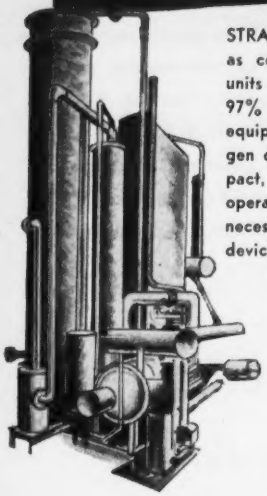
Produces
✓ free-flowing
✓ non-caking
✓ dust-free
fertilizer

The trend towards producing more concentrated, granulated fertilizers has become quite apparent during the past several years. To the majority of farmers, a free-flowing, non-caking, dust-free product with eye appeal is the only acceptable product. The demand for such a fertilizer has increased so sharply that dozens of plants have literally sprung up throughout the country to turn out this vital material.

The improvements in ammoniating and granulating processes has done more to change the fertilizer industry classification to its present advanced position than has any other factor. One of the outstanding processes — and one that has received only limited publicity to date — is the Davison-Trenton process developed by Davison Chemical Company, Division of W. R. Grace & Co., Baltimore, Maryland. Initiated in 1953 at their Trenton, Missouri, plant, the process has met with such great success that Davison now has 10 installations in operation.

The process has four outstand-

NEW! straub
NITROGEN GENERATORS



STRAUB Nitrogen Generators are built as complete packaged units. Standard units are capable of producing up to 97% pure nitrogen — with accessory equipment practically 100% pure nitrogen can be made. This new line of compact, low cost generators are easy to operate and are equipped with all necessary control equipment and safety devices.

Be sure to get full details on STRAUB Nitrogen Generators — built in a standard range of capacities from 1500 to 20,000 C.F.H. Larger and smaller sizes are also available.

Get your copy of descriptive catalog.

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4930 Grayton Road, Cleveland 11, Ohio
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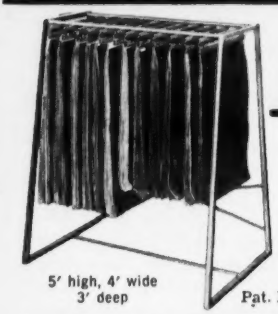
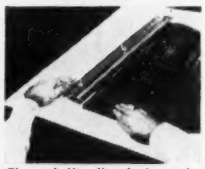


5' high, 4' wide 3' deep

Pat. Pend.



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For longer print "life" and for efficiency, durability and economy in vertical filing, specify Glider. Order now through the best office suppliers or write for illustrated literature.

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Check 3030 opposite last page.

ing features: 1) flexibility to economically utilize large amounts of almost all types of commercial nitrogen solutions containing free ammonia, 2) high rate of production for closely sized free-flowing particles, 3) minimum operating costs, and 4) advanced centralized instrumentation and control system.

Dry Mixing of Raw Materials

Dry ingredients such as ammonium sulfate and superphosphates are screened through a 6-mesh screen and weighed either automatically into separate hoppers, or manually into a single hopper. In both cases, the dry batch is weighed and mixed on a time cycle corresponding to the production rate. The dry materials are then mixed in a rotary mixer and discharged into an elevator which dumps material into the wet-mixer surge hopper.

The time cycle is established to assure maximum retention of the material in the rotary mixer. The blended dry materials are discharged from the surge hopper at a specific rate by means of a poidometer weigh belt or a rotary vane feeder. The supply level in the hopper is indicated by a level indicator light system to both the raw materials weighman and the control room operator.

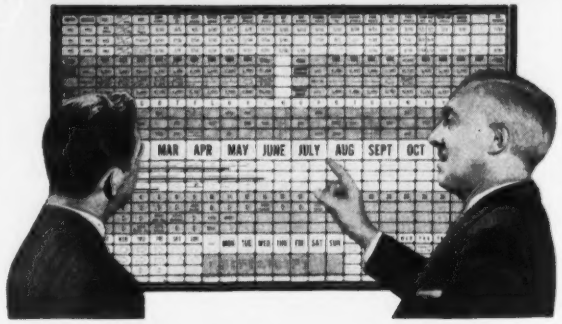
Liquid Distribution System

Liquid ingredients (sulfuric acid, phosphoric acid, water, ammonia) are introduced into the blended dry materials in several types of piping arrangements. No liquid distribution system has been universally adopted. Each plant superintendent has certain approaches that seem to work best for his plant.

In any system, it is desirable to accomplish the following: 1) provide minimum interference to the location of paddles and movement of the material through the mixing unit, and 2) provide efficient distribution of pre-mixed and partially reacted liquids.

Positive pressure and flow is maintained by pumps and pressure regulators located in

You Get Things Done Better By Seeing What's Happening



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GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

Check 3031 opposite last page.

What's
A "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

each liquid system. Temperature and pressure of the anhydrous ammonia are reduced prior to its passage through the flow meter. This is done by means of a heat exchanger using previously measured, but now expanded, anhydrous ammonia.

Ammoniation and Granulation

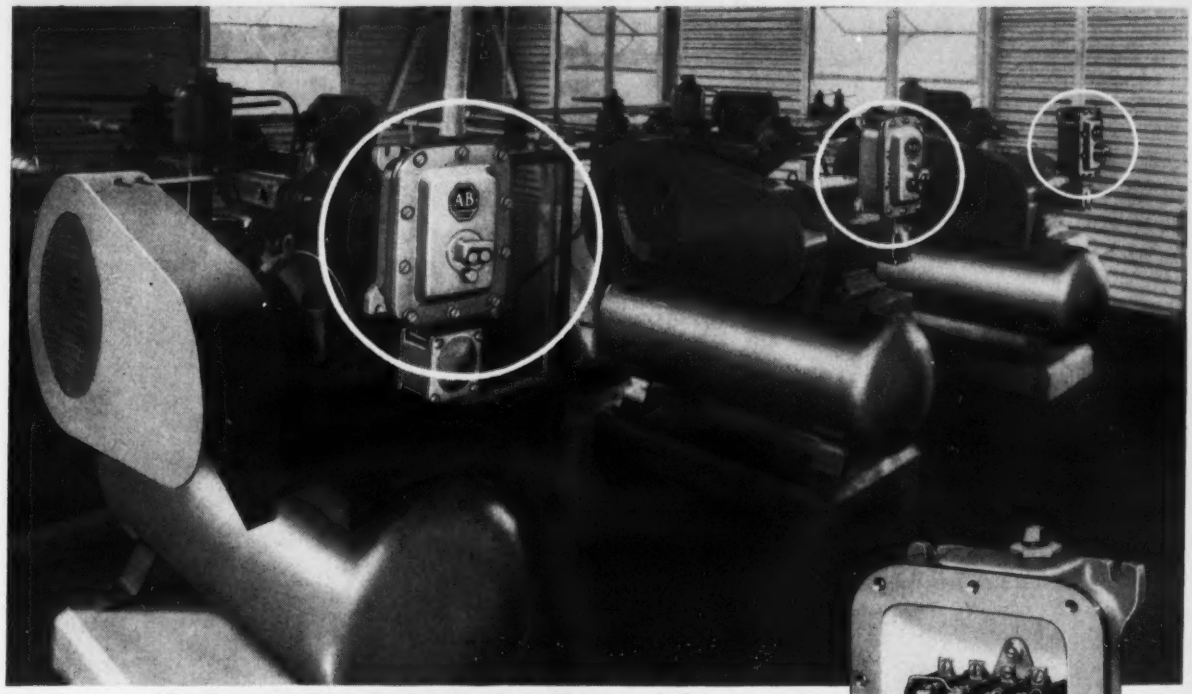
These steps are accomplished in a pug mixer. The liquids are introduced into the dry materials at various submerged locations, downstream from the dry materials feed area to permit thorough blending of the raw materials and the returned recycle portions. The weight and mass of material on all sides of the liquid distribution pipes tends to discourage the loss of any ammonia, thus enabling higher ammoniation ratios.

The pug mixer's paddles are designed and arranged to control mixing, retention, and the depth of bed in the mixer. The positive action of the paddles permits granule formation as ammoniation is being accomplished. Granule formation continues through the entire length of the mixer. Fines, from later classifying operations, can be returned to any spot in the mixer.

Drying and Cooling

Drying is accomplished in rotary dryers by concurrent flow of heat. Units are designed to provide low-temperature drying for grades formulated with large amounts of phosphoric acid, urea, ammonium nitrate, etc. High-temperature drying is also possible for grades formulated with none or small amounts of the above heat-sensitive ingredients. Chute from wet mixer discharges material so particles will be slightly case hardened prior to coming in contact with dryer flights.

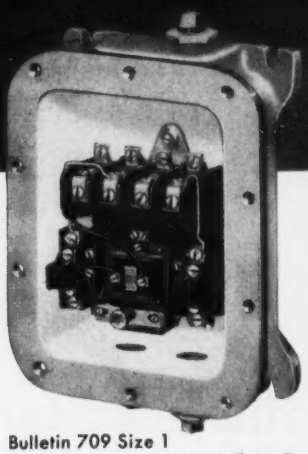
Dryer flights are designed to provide a steady cascading action throughout the length of the tube and to use maximum efficiency of drying air. In addition to smoothing the irregular shaped particles, the cascading and ultimate shattering action achieved in the



Allen-Bradley explosion-proof starters in an LP gas terminal.

Don't waste time removing covers!

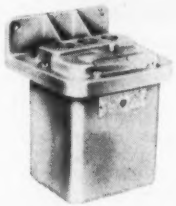
Allen-Bradley starters are good for millions of operations . . . without maintenance



Bulletin 709 Size 1 Solenoid Starter in NEMA Type 7 explosion-proof enclosure.

Type 1 General Purpose Enclosure

Type 4 Watertight Enclosure



Type 8, Oil-Immersed for Hazardous Corrosive Gas

Type 9, for Hazardous Dust

Because so much time is lost in removing and replacing the bolted covers of explosion-proof starters, it's important that the starters operate over long periods without service attention. That's why you ought to buy Allen-Bradley starters. Having only *one* moving part, these starters are good for millions of trouble free operations. The double break, silver alloy contacts never need servicing . . . they are *always* in perfect operating condition. For the starter you can install—and forget—specify Allen-Bradley. Send for the A-B Handy Catalog . . . a guide to *quality* motor control.

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL

Check 3032 opposite last page.

NEW

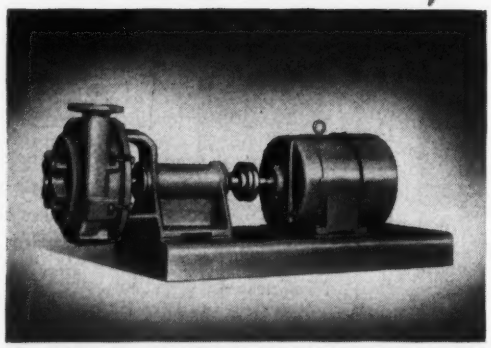
MORRIS TYPE BA

high speed centrifugal slurry pump

fills need for superior abrasive resistance in smaller sizes

The Morris Type-BA slurry pump combines the application of modern hydraulic engineering with simple design and structural strength to achieve superior abrasive resistance. It is available in cast iron, Ni-hard or 316 stainless steel in 1″, 1½″, 2″, 3″ and 4″ discharge sizes. It features a semi-open impeller, renewable suction lining and quick, easy dismantling and reassembly.

This new, competitively-priced high speed slurry pump was developed by the world's foremost manufacturer of heavy-duty dredging, hydraulicking and industrial slurry pumping equipment. It is designed to handle chemical process slurries and suspensions of sand, coal, crystals, silt, sludge and lime. Its compact but rugged construction assures dependable 24-hour duty in abrasive process handling.



FOR FURTHER INFORMATION and engineering drawings of the Type BA series, write for Bulletin 188.

MORRIS CENTRIFUGAL PUMPS

MORRIS MACHINE WORKS
BALDWINSVILLE, N. Y.
Sales Offices in Principal Cities
Export Office: 50 Church Street, New York 7, N. Y.

Check 3033 opposite last page.

dryer frees the grainy particles comprising the soft lumps fed to the dryer.

To insure proper action of the dryer flights, beaters are mounted in the dryer. These extend from a common shaft and are lifted and dropped by out-of-phase cams. This permits beater to strike in a progressively advancing spot as dryer rotates.

Dryer lowers moisture to within ½ to ¾ percent of final desired amount. Product is then sent to cooler which drops temperature about 100°F and brings moisture content to within final specification limits.

Classification

Product sizing is done by a 4 x 15-ft double deck screen. Unit is equipped with an exhaust manifold for temperature and dust control. The fan also applies suction to other dust control points in the system. Oversize is brought by gravity through a chute to a pulverizer for cracking and is then returned to the classifying elevator or the recycle elevator.

Material that passes through the bottom screen is returned to the pug mixer by means of an elevator discharging onto a fines conveyor belt. The product is discharged into a chute which takes the material to storage or sends a controlled portion to storage and a portion to the recycle system, depending upon requirements.

The control room is centrally located to permit easy access to flow of materials through the entire system. An inspection of the material at different control points reveals any desirable or undesirable process influences which would be changing the character and properties of the fertilizer granules. Four men are needed to operate a plant, including a part-time foreman.

During the past few years,

To page 110

For more information on product at right, specify 3034 . . . see information request blank opposite last page.

BE AND SHELL EX-ANGERS incorporating ent designs and stand-ds . . . Bull. 448.

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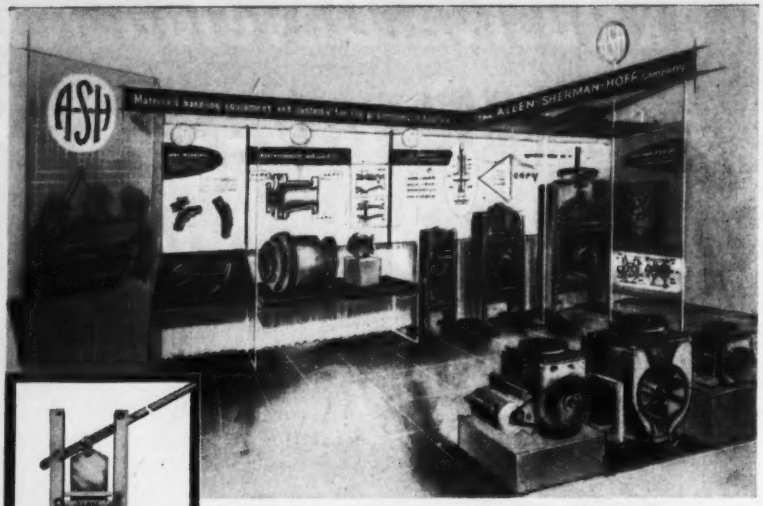
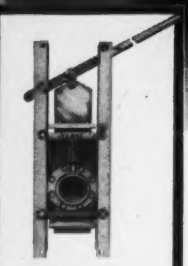
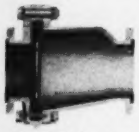




Positive cutoff slide valves

Process pipe and fittings



Lined check valves

Rotary Feeders

A-S-H Materials Handling Components Demonstrated at the CHEM SHOW

At the recent Exposition of Chemical Industries, thousands of process engineers visited The Allen-Sherman-Hoff Co. Booth to examine our specialized line of engineered valves, feeders, pipe and fittings. For many, here was the answer to process materials handling problems that were "weak links" of entire systems.

Most visitors took with them our Snip-N-Send Information Folder. This booklet highlights the advantages of A-S-H materials handling components *and* makes it easy to get further detailed information.

If you don't know enough about these units, snip and send this coupon and we'll rush you our Information Service for the Process Industries. It's an easy step towards solving *your* handling headaches.

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From page 108

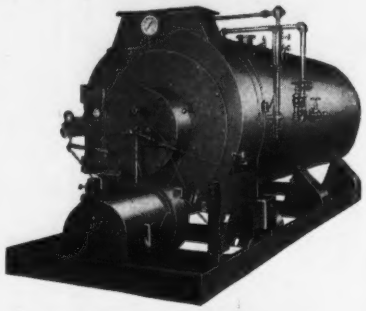
formulas have been successfully used with and without sulfuric or phosphoric acid, and containing large amounts of nitrogen solutions characterized by varying amounts of urea and ammonium nitrate in addition to free ammonia. Formulations include: 3-9-18, 3-12-12, 5-20-20, 5-10-10, 8-24-8, 10-20-10, 12-12-12, 13-39-0, 15-15-15, and 16-20-0.

(Based on paper prepared by J. E. Reynolds, Jr.; N. K. Alfrey; and G. W. Rose; Davison Chemical Company, Division of W. R. Grace & Co., Baltimore, Maryland.)

Nuclear energy facts

Illustrated with 86 drawings, photographs, and flow charts, 216-page handbook on nuclear operations in the US is designed for industrial management and others interested in atomic energy. Volume is entirely devoted to peaceful uses of atomic energy and covers functions and services of AEC along with much other pertinent and valuable information. To obtain "Atomic Energy Facts," remit $2.00 direct to Superintendent of Documents, United States Government Printing Office, Washington 25, D.C.

want to buy a pound of steam for less money?



CYCLOTHERM...

engineered for economy, cuts steam costs.

Cyclotherm's automatic operation and simplified construction keep costs down to an absolute minimum. Automatic controls allow 60 hp (or larger) models to modulate from 30% to 100% of capacity without loss of efficiency. Smaller models automatically cycle on and off as steam is needed.

Cyclotherm's two-pass construction guarantees a minimum of 80% efficiency, cuts maintenance costs 30% to 50%. Firetube never needs cleaning. Front and rear assemblies are quickly removed.

Shipped ready to operate, Cyclotherm is a complete package boiler with one manufacturing responsibility. Sizes range from 18 to 750 hp (15 to 200 psi). Designed to burn oil, gas or combination. For full information, write Cyclotherm Division, National-U.S. Radiator Corporation.

Cyclotherm Corporation
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Send me free copy of your booklet, "Cyclotherm Cyclonic Combustion."

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Company_____

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

U.S.I. Among Winners of Chemical Engineering Achievement Award

The 1957 Award for Chemical Engineering Achievement, presented at *Chemical Engineering's* Annual Award Dinner at the Waldorf-Astoria in New York on Tuesday, December 3, is a group award recognizing the pioneering application of chemical engineering principles and proceses in extractive metallurgy.

U.S.I. is one of 75 organizations in industry and government to share this honor, and is cited for its contribution to zirconium and titanium process technology. The U.S.I. processes for these metals are based on sodium reduction of the metallic tetrachlorides and are believed to be the most economical processes developed to date for the production of metal sponges.

The citations of the Committee of 90 senior educators, under the chairmanship of Dr. Walter Whitman of M.I.T., are limited to the newer metals: uranium, plutonium, zirconium and hafnium, tantalum and niobium, lithium, boron, beryllium, thorium and the rare earth metals. Also included as important to the nuclear industry are aluminum, nickel and titanium.

New Process to Synthesize DL-Piperitone Depends On Sodium Dispersions

DL-Piperitone can now be synthesized from ethyl acetoacetate, a by-product of neoprene manufacture. As against natural piperitone, a synthetic material has the advantage of dependable supply. Consequently an efficient and inexpensive method of commercial production has been sought for some time.

The technique of dispersing metallic sodium in inert hydrocarbon media, developed and perfected over the past several years by U.S.I., is at last providing a practical solution to the problem. A proposed commercial process based on this technique follows:

(1) Sodium and isooctane are agitated together to form a dispersion which is added to ethyl acetate in the mole ratio of 7.3 to 1. The resulting solution is heated.

MORE

Vinyl Heat Stability Improved When ISOSEBACIC® Acid Is Used As Plasticizer Intermediate

New Plant Starting Up To Produce ISOSEBACIC Acid

A newcomer among plasticizer intermediates, ISOSEBACIC acid, is improving the heat stability of polyvinyl chloride films. The table below is based on tests conducted by a formulator of top-grade films for seat-cover use. It gives the comparison between diisooctyl Isosebacate, an ester of ISOSEBACIC acid, and a commonly used plasticizer, diisodecyl adipate.

Comparing columns (1) and (2), it can be seen that heat stability improves 50%, from 30 to 45 minutes, when 15 parts of the Isosebacate replace an equal quantity of adipate. A comparison of columns (3) and (4) reveals that heat stability is improved 100%, from 30 to 60 minutes, when both ester concentrations are raised to 22 parts.

Tests also indicate that ester plasticizers formulated with ISOSEBACIC acid have improved color, odor, and oil and soapy water extraction properties. These properties are important for applications such as auto seat covers, furniture upholstery covers, shower curtains, luggage and handbags.

ISOSEBACIC acid is a mixture of isomers of sebacic acid in about these proportions:

2-ethyl suberic acid 72-80%
2,5-diethyl adipic acid 12-18%
sebacic acid 6-10%

In addition to the vinyl plasticizer application, the material is being evaluated in polyurethane foams, polyamides, polyesters, alkyd resins and jet lubricants.

ISOSEBACIC acid is a product of U.S.I. research. It is derived from butadiene and sodium, both available in unlimited supply. U.S.I. is now in the process of starting up its new ISOSEBACIC plant at Tuscola, Ill.

Diborane Now Produced Commercially; 3 Amine Boranes Being Researched

Diborane, precursor of pentaborane rocket fuel and promising as an intermediate, reducing agent, catalyst and flame speed accelerator, is being marketed in commercial quantities.

According to the manufacturer, physical and chemical properties are now completely determined. Chemical reactions which have been thoroughly investigated include those with ammonia, amines, phosphines, ethers, carbonyl compounds, hydrocarbons, metal alkyds and hydrides, and sodium.

Amine Boranes in Research Quantity

Also available, although in research quantities only, are dimethylamine-borane, trimethylamine-borane and pyridine-borane. Their utilization as selective reducing agents in non-aqueous solvents has been of most interest. They are polymerization catalysts and inhibitors for acrylates and vinyl compounds. In addition, applications as antioxidants and stabilizing agents have been suggested as promising possibilities.

Table of Field Test Data Comparing Diisooctyl Isosebacate Against DIDA as a Vinyl Plasticizer Intermediate

FORMULATION	Parts Per Hundred of Resin			
	1	2	3	4
PVC	100	100	100	100
DIOP (diisooctyl phthalate)	18	18	22	22
DIDA (diisodecyl adipate)	15	—	22	—
Diisooctyl isosebacate	—	15	—	22
Phosphate plasticizer	11	11	—	—
Stabilizer A	2	2	2	2
Stabilizer B	1	1	1	1
Stabilizer C	1	1	1	1
1. Volatility (active carbon method) 24 hrs. at 158 F, % loss	1.38	1.21	0.92	1.07
2. Clash-Berg, Tf, C	−24.4	−20.0	−23.9	−23.4
3. Heat Stability, minutes stable at 350 F	30	45	30	60
4. S.P.I. Impact Test (Masland) Pass/Fail F	−20/−25	−20/−25	−20/−30	−25/−30
Gauge	0.019"	0.020"	0.019"	0.021"
5. Germicidal Lamp Test, 16 hrs, tack	slight	slight	slight	slight
6. Blooming, Room Temperature, press polished	O.K.	O.K.	O.K.	O.K.

U.S.I. CHEMICAL NEWS

CONTINUED

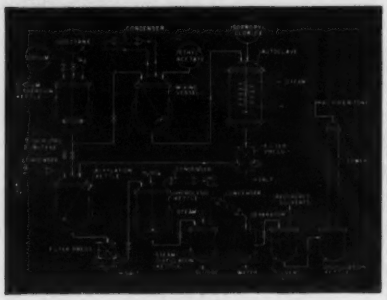
DL-Piperitone

(2) When reaction is complete, isopropyl chloride is added and the mixture is heated.

(3) The resultant slurry is filtered and the filtrate is alkylated with dispersed sodium to form the sodium enolate of ethyl oxisopropyl acetoacetate.

(4) 1,3-dichloro-2-butene in anhydrous benzene is added, and the mixture is refluxed until neutral.

(5) After filtration, the mixture is hydrolyzed with sulfuric acid, distilled and stripped of solvents. A crude, high-boiling dl-piperitone results. Further distillation yields pure dl-piperitone.



With this process, synthesis of DL-piperitone is reported to be commercially feasible.

New Standard Issued on Polyethylene Plastic Pipe

A new Commercial standard for black flexible polyethylene plastic pipe has been established by the Dep't. of Commerce, in cooperation with the Society of the Plastics Industry and the Nat'l. Sanitation Foundation.

The new standard, CS 197-57, specifies that "... the pipe shall be manufactured of virgin polyethylene, that no scrap material has been used, and that it is satisfactory for potable water." It also lists new dimensional tolerances and testing procedures.

Copies are available from Superintendent of Documents, U. S. Government Printing Office, Washington 5, D. C. for 10¢ a copy.

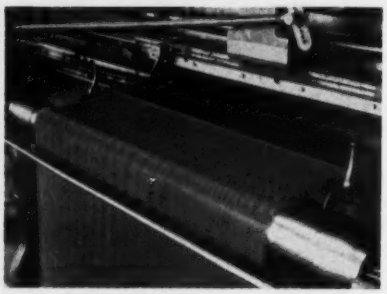
Corrosion-Resistant Mesh Is Now Produced with Improved Titanium Wire

The fabrication of titanium wire cloth now has reached a production basis. This is due primarily to improvements in quality of wire, which until recently lacked the needed uniformity and elongation, and had a tendency to work-harden rapidly and gall on metal-to-metal contact.

With wire-forming problems licked, and cloth being fabricated efficiently with high-purity and ductile grades of mill product, new applications are developing rapidly. Although noted for its high strength-to-weight ratio the biggest advantage of titanium in wire cloth form is its unique corrosion resistance. The metal has a corrosion rate of only .000001 inches per year in sea water, and is not subject to stress corrosion cracking in sea water or sea air.

Titanium wire cloth is being fabricated more and more into filter screens, catalyst screens or similar assemblies, where it handles mineral acid solutions, sodium hypochlorite, chlorides of all kinds, organic acids, alkalies and other reagents, with superior resistance to corrosion.

Several companies also report ability to make woven screen from zirconium wire, for those applications where zirconium corrosion resistance is superior to titanium.



Titanium wire cloth being woven (photo courtesy Cambridge Wire Cloth Company).

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

A silicone rubber which vulcanizes at room temperature has just been introduced for encapsulating, potting, sealing and caulking. Retention of rubber-like properties from —70 to 500°F is claimed. **No. 1301**

"The Rudiments of Feed Formulation", a 6 page reprint reviewing the industrial sources of animal feed constituents, the formulation of mixed feeds and the energy and nutrient values found therein, is now obtainable on request **No. 1302**

A new monomeric ester-type plasticizer for vinyls and cellulosics is described in a 4-page data sheet now available. Chemically it is di-2-ethylhexyl Isosebacate, reported about ⅓ lower in cost than the corresponding sebacate. **No. 1303**

Entirely new series of high molecular weight disazo red pigments for PVC and latex paints is said to combine the strength and brightness of organic pigments with the stability normally associated with inorganic pigments. **No. 1304**

Thioglycolic acid — its properties, reactions and uses — is described in a new 20-page catalog now available free of charge. An extensive bibliography of relevant patents and trade paper articles is included. **No. 1305**

Ethyleneurea (2-imidazolidinone), a new chemical, is now on the market. Used to make lacquers, varnishes, finishing agents, adhesives, plasticizers. Forms highly polymerizable vinyl and other derivatives. **No. 1306**

New series of zinc rich coatings to protect steel from the atmosphere and in marine and chemical use has been developed. Applied by brush or spray. Are said to be tougher, tighter, better bonded than old-type zinc coats. **No. 1307**

New adhesive for polyurethane foams is made with new, extremely fast-drying polymer, is said to lose its depression tack faster than any other material on market. Permits bonding with an adhesive as soft as the foam itself. **No. 1308**

A gas analyzer for measuring trace hydrogen, oxygen and nitrogen in metals has just been introduced for use right in the mill. Claimed to be only apparatus on market for both vacuum fusion and extraction. **No. 1309**

Pyridine N-oxide can now be obtained in commercial quantities. This exceptionally reactive derivative can be used to prepare many other pyridine chemicals valuable to the drug, dyestuff and allied industries. **No. 1310**

PRODUCTS OF U.S.I.

CHEMICALS FOR PLASTICS

ISOSEBACIC® Acid: mixture of isomers of C_{10} aliphatic dibasic acids.
PETROTHENE® Polyethylene Resins.
Butanol (Normal Butyl Alcohol): solvent for resins.
ANSOL® M: anhydrous denatured alcohol, special blend for resins.
ANSOL® PR: anhydrous denatured alcohol, special blend with higher ester content.
Normal Butyl Acetate: medium boiling solvent for nitrocellulose.
Ethyl Acetate, 93-98%: solvent for cellulose derivatives.
Ethyl Ether, Technical: solvent for resins.
Acetone (Dimethyl Ketone): solvent for vinyl resins, cellulose acetate.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone, Diatol®.

Intermediates and Fine Chemicals: Acetoacetarylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, MOREA® Premix, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin D_3 and K_3 Products, Antioxidant (BHT) Products, Special Mixes, U.S.I. Permadry Products (Sealed-In Vitamin A).

Inorganic Chemicals: Ammonia, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sulfuric Acid.

Metals: Titanium Sponge, Zirconium Sponge, Zirconium Platelets, Hafnium Oxide, Hafnium Sponge.

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ASQC holds 10-day course in statistical techniques for process development

Continued success in finding the most influential variables in a chemical process through statistical methods, prompted the Chemical Division, American Society For Quality Control, to again team with Harvard Business School to offer a 10-day course in the latest developments in advanced techniques.

The new course, "Statistical Methods For Process Development", was scheduled for January 12-23, 1958, at Harvard Business School. Course was designed primarily for research and technical personnel with experience in using statistics in industrial experimentation. Fee (including lodging and meals): $375.

A three-day short course in statistical concepts was held by the society in May 1956. Demand was so great that three additional sessions were held at the Universities of Michigan and Houston, and M.I.T. in the past year.

(Additional information about ASQC may be obtained from Richard S. Bingham, Jr., Supervising Engineer, Q. C. Branch, The Carborundum Company, PO Box 337, Niagara Falls, New York.)

Tracer technique uses

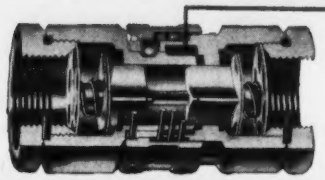
Tests of uses of radioactive tracer displacement technique are described in 61-page report. Report describes applications of tracer technique to fluid dynamic studies in tubes of one-half and one-inch diameter. To obtain report PB 121652, "Boundary Layer Radioactive Tracer Technique, Part 2 — Application," remit $1.75 direct to Office of Technical Services, US Department of Commerce, Washington 25, District of Columbia.

WHICH SNAP-TITE QUICK-CONNECT COUPLING IS BEST FOR YOU?

SNAP-TITE "H" COUPLING . . . . . FOR HIGH PRESSURE APPLICATIONS

FOR HYDRAULIC OR AIR

"H" Coupling for high strength, higher efficiency, high-resistance to heavy line surge. Sizes: ⅛" thru 12". Bulletin No. 240

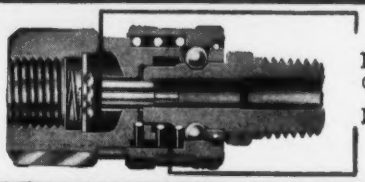


Exclusive U-packer gives a positive seal without compression set because of rubber distortion. Line pressure inside the U-packer keeps it open and forced against its metal backing—the higher the pressure, the tighter the seal.

SNAP-TITE HI-FLOW COUPLING . . . FOR LOW PRESSURE APPLICATIONS

FOR AIR AND FLUIDS UP TO 150 p.s.i.

Hi-Flow is recommended to connect small air tools to plant air system, and for low pressure fluid transfer in small lines. Sizes: ⅛" thru ½". Bulletin No. 230

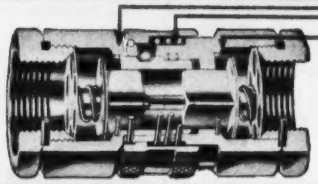


Bonded valve washer (pat. pending on valve construction)

Exclusive U-packer

SNAP-TITE "HK" COUPLING . . . . FOR HARD TO HANDLE FLUIDS

FOR FUMING ACIDS, ALKALIES, SOLVENTS, AND HIGH PRESSURE STEAM . . . "HK" is the only coupling now on the market for fluid temperatures from —100° F to +500° F . . . and for live steam up to 460° F. Its seals are made of Teflon for which there is no known solvent. Sizes: ½" thru 3". Bulletin No. 270



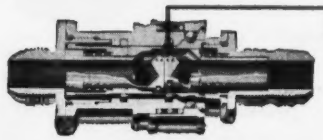
Teflon Valve Seal

Teflon Nipple Seal

Teflon Valve Seal

SNAP-TITE NO-SPILL COUPLING . . . FOR MINIMUM AIR INCLUSION

FOR AIRCRAFT, MISSILE HYDRAULIC, FUEL SYSTEMS which cannot stand air in the lines, and for transmitting fluids which *must not spill*, the Snap-Tite no-spill coupling is recommended. Bulletin No. 260A

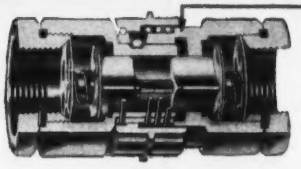


Flush valves prevent spillage, air inclusion. Snap-Tite will engineer special variations to your requirements.

SNAP-TITE "E" COUPLING . . . . . FOR VACUUM and VERY LOW PRESSURE

FOR VACUUM SYSTEMS IN THE MICRON RANGE

"E" Coupling performs in the *micron* range in the smaller sizes both connected and disconnected. Recommended, too, for gravity flow . . . U.L. approved for LP Gas. Sizes: ⅛" thru 12". Bulletin No. 250



Nipple seals in coupler by depressing the lip of the E packer and slightly compressing the body of the packer. This new E-packer gives positive seal under high-pressure, low-pressure, and vacuum.

Snap-Tite Couplings are available plain, (without valves), and with either single or double shut-off. Couplings normally furnished in alloy steel, but all (except hi-flow) are also available in brass, aluminum, or stainless steel with a variety of finishes.

SNAP-TITE, INC., UNION CITY 6, PA.

Snap-Tite

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

Check 3038 opposite last page.

For more information on product at left, specify 3037 . . . see information request blank opposite last page.

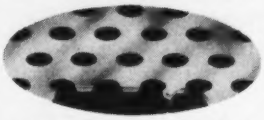
TO IMPROVE SOLIDS-LIQUID SEPARATION PROCESSES

Consider

MULTI-METAL FILTER MEDIA

"Multibraid" (magnified); dense, strong, woven filter cloth.

"Neva-Clog" (magnified to show flow); perforated sheet metal filter medium.



"Mykro-Pore" (magnified cross-section); electrodeposited filter medium.

Wire Cloth and Filter Cloth in all alloys, and every degree of density down to 400 mesh and in all weaves.

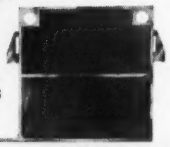
"Neva-Clog" perforated sheet metal medium functions on edge filtration principle.

"Mykro-Pore" electrodeposited filter medium in pure nickel, with round or slotted holes; wide range of opening sizes, hole patterns, open area ratios and thicknesses.

MULTI-METAL FABRICATIONS

"Rim-Lok" leaf for vertical or horizontal filters.

"Sweetland" filter leaf.



"Multi-Plate" fabricated filter press plate.

Elements for gas stripping process.

Vibrating screen disc.

A complete, comprehensive and versatile service in converting filter media into filtration or other processing components or complete units:

Filter leaves for all pressure and vacuum filters; screens for plate and frame presses; tubular filter elements; strainers; vibrating screens; baskets; hoppers; cylinders; elements for dryers, catalyst units, washers, mixers, etc., and complete apparatus or machinery.

Catalog 57 gives helpful, practical information on Multi-Metal research, engineering and product services for better methods and means of solids-liquid separation. Write for a free copy.

MULTI-METAL WIRE CLOTH CO., INC.

1356 GARRISON AVENUE • NEW YORK 59, N. Y.

Check 3039 opposite last page.

Air filter has all-ceramic components made to resist chemicals and high temperatures. Units are available with or without (inset) flanges

Designed to provide particle-free air for critical air-cleaning problems, all-ceramic corrosion-resistant filter . . .

removes 99.5% of 0.3-micron particles from 2300°F gases

Uses: Filtering high-temperature air or gases.

Features: Filter's ceramic construction resists all chemicals except hydrofluoric acid. Unit can remove particles as small as 0.1 micron. It has guaranteed efficiency of 99.5% 0.3-micron particles at temperatures up to 2300°F. Filter can also resist temperatures to 3200°F for about 1 hr.

Description: All-ceramic filter consists of closely spaced pleats of filter media with corrugated separators between the folds. Separators permit passage of air or gas streams to bottom of deep pleats so that entire area of filter media is effective.

Media and separators are sealed into frame with ceramic adhesive. Edge gaskets are provided to prevent air leaks between filter frame and hold-

ing frame when filter is clamped into place.

Because all components are made of the same material, they expand and contract uniformly, eliminating cracking between frame and media under high temperatures.

Units are available in various sizes ranging from 8x8" face area with 5⅞" depth to 24x24" with 11½" depth. Air flow capacity at 0.8" WG varies from 50 cfm on smallest unit to 1000 cfm on largest. Maximum penetration of 0.3 micron DOP smoke is 0.500% on all filters at the rated flow capacities.

Filter is an improved version of unit originally developed by the Army Chemical Corps for removing bacteria and radioactive particles from air.

Earlier designs had corrugated separators made of cellulose acetate, asbestos, glass, or metal; and frames made of wood, glass, or metal.

(Ceramic Airpure filters are product of Flanders Filters, Inc., PO Box 718, Riverhead, New York.)

Check 3040 opposite last page.

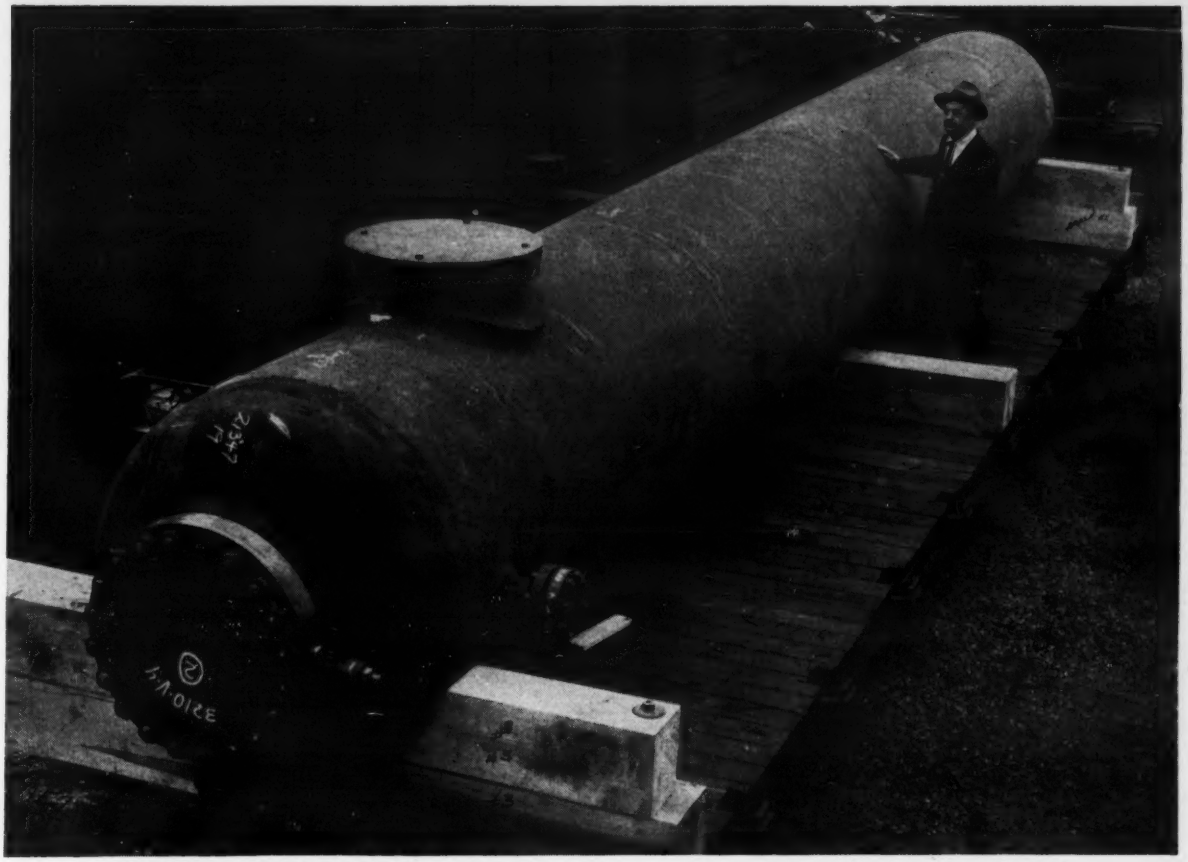
College recruiting standards developed for colleges and employers

Offered for voluntary acceptance to end confusion

A single set of recruiting standards has been developed for voluntary acceptance by colleges and employers, including government agencies. Published by the Chamber of Commerce of the US and the College Placement Council, Inc., the standards seek to end confusion brought about by many current statements on college recruiting standards.

The publication lists specific responsibilities for students, colleges, and employers so that selection of a career can be made "in an objective atmosphere with complete understanding of all the facts."

Among practices disapproved by the recruiting guide are bidding up of salary offers by competing employers, elab-



NEWPORT NEWS BUILT two 39'-7" horizontal gas scrubbers, such as this, for J. F. Pritchard & Co. They were made of ASTM-A212 Grade B fire box steel, with structural mesh steel interiors.

Gas scrubber made of 2⅞" steel

Newport News builds almost any type of pressure vessel and other heavy process equipment

Here is one of two horizontal gas scrubbers recently built for an operating pressure of 1800 psi at 300°F.

Newport News made both vessels from fire box steel, 2⅞ inches in thickness. We formed and automatically welded this steel into sections having a diameter of only 4 feet.

Rolling thick steel to this small diameter...no easy accomplishment, as you probably know . . . demonstrates the sort of jobs Newport News takes in stride.

Almost any type of heavy processing equipment is readily constructed by Newport News in a 225 acre plant comprising huge, fully equipped fabricating and machine shops, foundries, forge and die shops, heat treating and allied equipment as well as complete test facilities.

Newport News shop erection of fabricated units helps to speed assembly at your plant site.

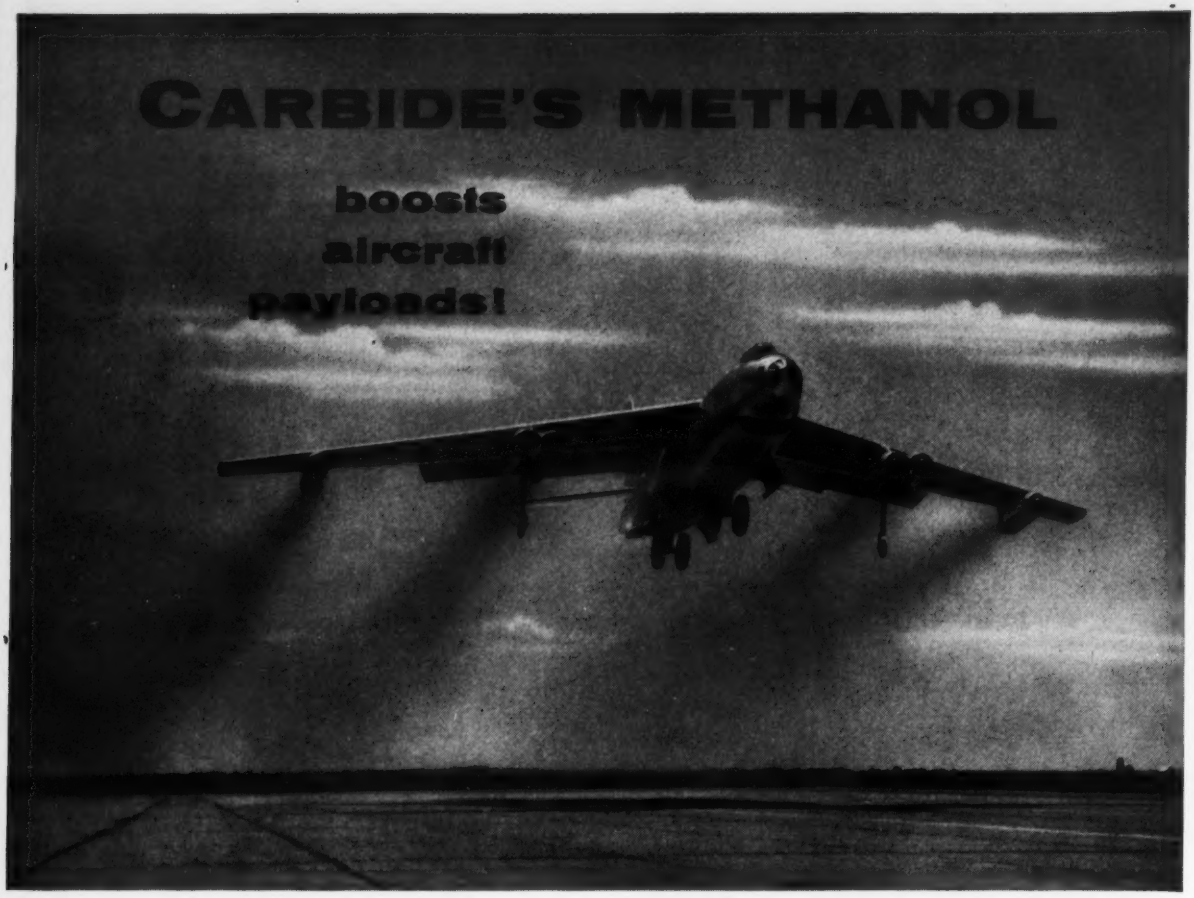
Get a bid from Newport News on your present or future projects. Get the benefit of specialized production techniques. Look over the many ways in which Newport News can help you . . . write for "Facilities and Products", a very interesting booklet. It's yours for the asking.

ENGINEERS Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

ROLLING 2⅞" STEEL for gas scrubbers. The steel, in a hot condition, was formed on the heavy bending equipment shown here. It will cold roll mild steel up to 3 inches thick, and will hot roll any grade of steel up to a thickness of 5 inches.

Newport News Shipbuilding and Dry Dock Company
Newport News, Virginia

Check 3041 opposite last page.



only one of many uses you can benefit from . . .

Added take-off power means higher payloads. And power output can be boosted for both modern turbo jets and conventional propeller engines. How? Simply by using an inexpensive methanol-water mixture, made from CARBIDE's methanol. In turbojets this mixture gives greater thrust and acceleration during take-off than jet fuel alone. Propeller engines gain 15 to 17 per cent horsepower.

But this is only one application of methanol—a few of the many other uses are as a solvent in the manufacture of vinyl acetate adhesives, aniline dyes, shellac, varnishes, wood stains, duplicating fluids and special printing inks.

CARBIDE's methanol is also used as a methylating agent for organic compounds, a raw material for formaldehyde, and an automobile anti-freeze base.

CARBIDE's Methanol is best for these and other uses because:

- Has a minimum purity of 99.85 per cent methanol by weight
- Can be shipped in: (1) 55 gallon drums in LCL or carload lots, (2) Compartment tank cars or tank trucks. And, tank cars range from 4,000 to 10,000 gallon capacity.
- Bulk stations are strategically located for your convenience

Ask the Technical Representative from Union Carbide Chemicals Company to tell you about these delivery services.

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CHEMICALS

Union Carbide Chemicals Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

For information on Methanol's uses and physical properties, write for technical information. Address: Union Carbide Chemicals Company, Room 328, Department M, 30 East 42nd Street, New York 17, New York. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

"Union Carbide" is a registered trade-mark of Union Carbide Corporation.

Photo Courtesy of United States Air Force.

Check 3042 opposite last page

orate entertainment of prospective student employees, special payments or other gifts, any undue influence on student job choices by faculty members, and expense account padding by students visiting company plants.

Other recommendations cited: Colleges should provide competent counselling services, available to individual students, as part of their general responsibility for development of the student. Information provided to students concerning an employer should be strictly factual.

No special bonuses or similar financial incentives should be given to influence a student's consideration of an employer's offer.

Acceptance of an offer by the student should be made in good faith and with the sincere intention of honoring his employment commitment.

The recommendations are based on studies by business groups, federal agencies, college placement officials, and officers of private and state universities brought together by the Chamber and the Council.

(To obtain "Principles and Practices of College Recruiting," remit 25 cents per single copy ($6.00 for 100) direct to Education Department, Chamber of Commerce of the US, 1615 H Street, NW, Washington 6, D. C.)

Lamp needs no power, provides illumination for 10 years

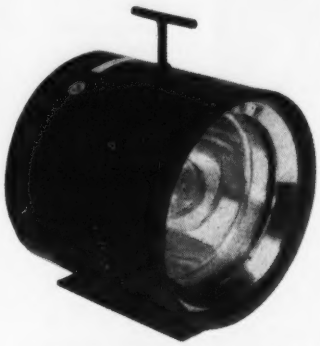
Radioisotope-excited unit has 1000-microlambert brightness

An improved radioisotope-excited lamp is available which provides marking illumination for periods of up to 10 years or more. Radioactive gas, krypton^{85}, is source of power. No maintenance or outside source of power is required

Unit is only ½ as heavy as the 20-lb model introduced earlier by manufacturer. It measures 6" in length, compared to 8¼" of earlier model. Lamp has luminous diameter

of 5", which, in combination with its 1000-microlambert brightness, makes it clearly visible at 500 yards.

Suggested applications include use in mining, transportation, marine, and heavy industries, and for low-level civil defense marking or other



Radioisotope-excited lamp is visible at 500 yards

applications where little or no power is available.

Lamp has a single port, and one color of emission per lamp is provided. By using different phosphors, unit may be made to emit blue, green, yellow, or orange-red.

(Model 535 lamp is made by United States Radium Corporation, Morristown, N. J.)

Carbon-14 compounds

Complete information and prices on commonly used carbon-14 labeled compounds, are presented in manufacturer's bulletin N-18 — Nucleonic Corporation of America, 196 Degraw St., Brooklyn 31, N.Y.

Check 3043 opposite last page.

World petrochemicals in February CP

Since the remarkable petrochemical development is world-wide, the monthly petrochemical section starting in CHEMICAL PROCESSING in February will contain petrochemical news from a number of foreign countries.

Look to COOK for Better Packings!

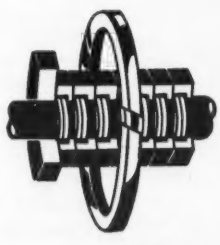
Don't Let This Happen To Your Packing Glands!

NO doubt about it — using the wrong material for a packing gland in corrosive service is like locking a wildcat in a cardboard box. It will be chewed up in no time!

There's no need for rust and corrosion to raise havoc with your packing glands, regardless of how tough the service. In 999 cases out of 1000, packing glands made of Cook stainless steel or Cook *Ni-Resist* type iron will solve your problem, once and for all.

For the remaining 1 problem in 1000, Cook can probably *design* an answer. That's because C. Lee Cook pioneered in the field of metallic packings — knows more about their specific, on-the-job applications than anyone else.

Whether you manufacture original equipment or want to recondition old packing cases, always insist on genuine C. Lee Cook parts and service. Write for full details. C. Lee Cook Company, 932 South 8th Street, Louisville 3, Kentucky.



C. LEE COOK COMPANY

Division of Dover Corporation

Rings and Packings Since 1888

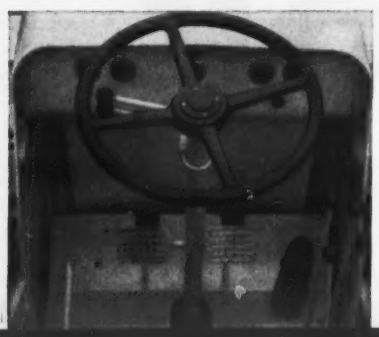
Check 3044 opposite last page.

If you had to drive a car for 8 solid hours in traffic like this . . .

would you be satisfied with an old fashioned gear shift?

Even an antique car enthusiast will have to admit that a manual gearshift is a tiresome business when you're caught in a traffic jam—when you have the constant clutching, and declutching and inching along in bumper-to-bumper traffic.

Did you ever recognize the similarity between a traffic jam and a typical bulk-handling job? In both cases, the runs are relatively short, constantly Stop and Go (and in bulk handling, constantly Forward and Backward). The automobile manufacturers long ago took this burden off the driver by giving him various types of "clutchless" transmissions. Now Clark has done the same thing for the industrial Tractor Shovel operator: Clark's exclusive Power-Shift transmission on the 16 cu. ft. MICHIGAN Model 12B.



No clutch pedal, no engine clutch

The small photo at left shows the operator's compartment of the MICHIGAN Model 12B. There's a double brake pedal—operate it with either foot. There's no clutch pedal, no engine clutch, no gear clash when shifting. This heavy-duty Clark transmission is as fast and as easy to operate as a modern car—the driver merely selects High-Low-Forward or Reverse and lets the Power-Shift transmission do the work. He can make any shift while moving in either direction.

Improves operator efficiency

Power-shifting drastically reduces operator fatigue. The MICHIGAN operator doesn't have to ride a clutch all day. He can work smoothly and easily through peak periods throughout the day and still be close to top efficiency when bulk-handling runs overtime. New operators can learn to run the MICHIGAN Model 12B in a few hours. And when several operators take turns on the MICHIGAN, the machine doesn't suffer—the hydraulic-operated Power-Shift transmission provides built-in protection against "clutch riders" and "cowboys."

See for yourself

Without any obligation, you can put the MICHIGAN Model 12B to work on any job in your own plant. We'll bet the MICHIGAN will outproduce any loaders in its size range, bar none. You be the judge. Clip the signature below to your letterhead and mail to us—we'll make the arrangements for an on-the-job demonstration.

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CLARK EQUIPMENT COMPANY
Construction Machinery Division
2491 Pipestone Rd.
Benton Harbor 4,
Michigan

CLARK® EQUIPMENT

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the slip opposite the back cover.

Be sure to answer all questions regarding your new location, title, and company.

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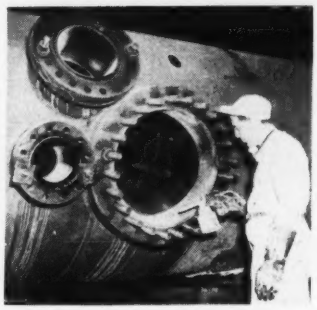
Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at left, specify 3045 see information request blank opposite last page.

Locates defects in linings on vessels and tanks

An electrified particle-inspection method used in other industries is increasingly being applied in the chemical industry for inspection of nonconductive coatings on processing vessels and tanks. Procedure locates defects, helps to eliminate their cause.

For test, a blend of calcium carbonate powder is blown through hard-rubber nozzle of a special powder gun. Electrons rub off as the particles pass through gun nozzle, charging the powder positively. As the powder approaches the test piece, electrons are attracted from the base metal.



Operator inspecting processing vessel for pinholes

Wherever a lower dielectric exists, such as a pinhole or crack, electrons tend to bunch up in the metal and exert their influence up through the defect. This appears as a pattern on the surface.

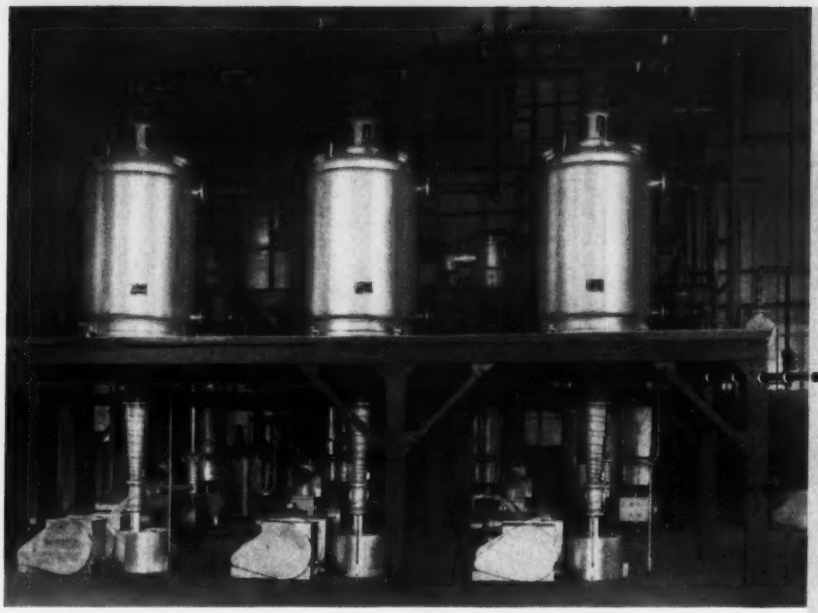
(Statiflux inspection method is development of Magnaflux Corporation, 7300 W. Lawrence Ave., Chicago 31, Ill.)

Check 3046 opposite last page.

PVC resin process

Suspension process for manufacture of PVC resins is described in eight-page bulletin. Photographs of four operating plants are shown together with flow sheet of process. "SD case histories" — Scientific Design Co., Inc., 2 Park Ave., New York 16, N.Y.

Check 3047 opposite last page.



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Three Asco Molecular Stills at Trans Penn Oil Co. Can Produce More than One Tank Car Per Day

ASCO ROTA-FILM
The Only Molecular Still Sold on a Royalty-Free Basis

are you the 1 in 20 who knows how*

MOLECULAR DISTILLATION

can increase profits?

If you are that one, you know that Molecular Distillation can process organic compounds with molecular weights from 200 to 1250 and silicones and halocarbons to 4000.

This means that a broad range of processes can be carried out with *better results* and at *far less initial cost and far less operating cost* than by methods commonly used. Here are a few such processes:

- Vitamin Recovery from Natural Triglycerides
- Purification of Monoglycerides
- Isolation of Natural Oil Components
- Distillation, Decolorizing, Recovery
- Purification of Pharmaceuticals
- Removal of odors, colors and nonsaponifiables from crude tall oil, fatty acids and materials of higher molecular weights in general.

Results and savings are often startling. For example, a leading pharmaceutical manufacturer *produces a tranquillizer from compazine base* (a previous impossibility) using an Asco Molecular Still—weekly savings more than equal still cost, and the product is purer! . . . A French chemical producer *distills electrical grade dioctyl phthalate* of high quality on a commercial scale. . . . A U. S. company de-glycerinates glyceride mixtures with remarkable economy, just one of the separations and distillations of glycerides possible with Asco Molecular Stills.

Many more similar cases can be cited in which Asco Molecular Distillation has increased profits, improved results.

*Based on Recent Survey of Chemical Engineers

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ARTHUR F. SMITH COMPANY
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Check These Asco Features:

- ☐ Capacity Per Unit Practically Unlimited
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A laboratory size Asco Rota-Film Molecular Still is now available. This permits inexpensive tests accurately transferable to Asco industrial models. Price is $391.

New Brochure
Fully Describes Models and Applications

TEST RUN SERVICE
Now you can have test runs and limited custom distillation performed at ASCO's Rochester plant. Cost is $125 per day. Write for complete details . . . Dept. CP-1.

Check 3048 opposite last page.

DEKORON PRODUCTS CUT INSTRUMENT TUBING COSTS

EASY-TO-INSTALL
INSTRUMENT
LINE HARNESS

DEKORON Poly-Cor is a tried and proven instrument tubing bundle having advantages of light weight, corrosion resistance and extreme ease of installation.

It is completely color-coded with 7 colors of tubing so placed in the bundle that each tube is easily identified by its relation to the other colored tubes. Their natural resiliency resists physical damage. Harness composed of from 2 to 37 (19 *illustrated*) individual lines is available.

Initial cost . . . installation . . . corrosion resistance . . . maintenance—*no tubing can compare with patented Dekoron Poly-Cor.*

Request Bulletin 456.

Use Dekoron E-Z Tube Fittings. Specifically designed for use with Poly-Cor or with single-line plastic Dekoron "P" Tubing.

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DEKORON PRODUCTS DIVISION

Check 3049 opposite last page.

Crystal growing becomes routine

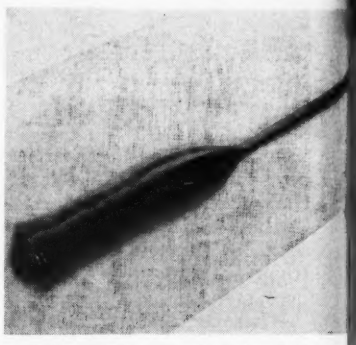
Controls hold temperature within 0.25° at 1400°C

Problem: Super-accurate temperature control is needed for growing of crystals. Even minor deviations of temperature — which would not affect other applications — will upset delicate balance needed to draw uniform crystals for use in transistors, at Lansdale Tube Company, division of Philco Corporation. Heat input to melt must be balanced so as to maintain a surface cloudiness. Delicacy of operation is suggested by fact that shape of a meniscus is used as guide in controlling progress of crystal growth.

Such extreme temperature control, as is needed for crystal growing, means melt temperatures must be held within ±0.5° at 1400°C. If temperatures rise more than 0.6°C above optimum growing point, end of crystal melts; if temperature drops 0.6°C below needed value, the melt freezes.

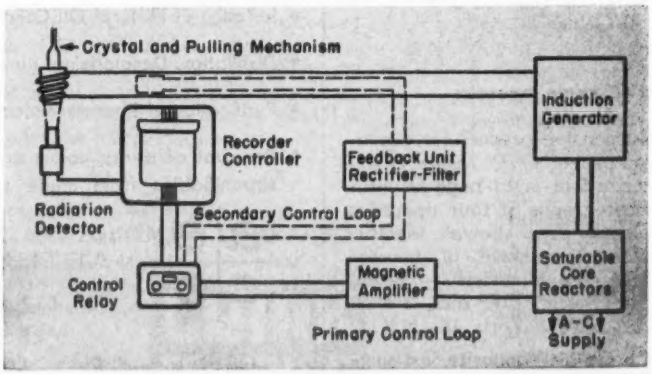
Solution: Installing a package unit, specifically designed for growing crystals, operators at Lansdale Tube Company are able to maintain the desired set points for hour periods at a time.

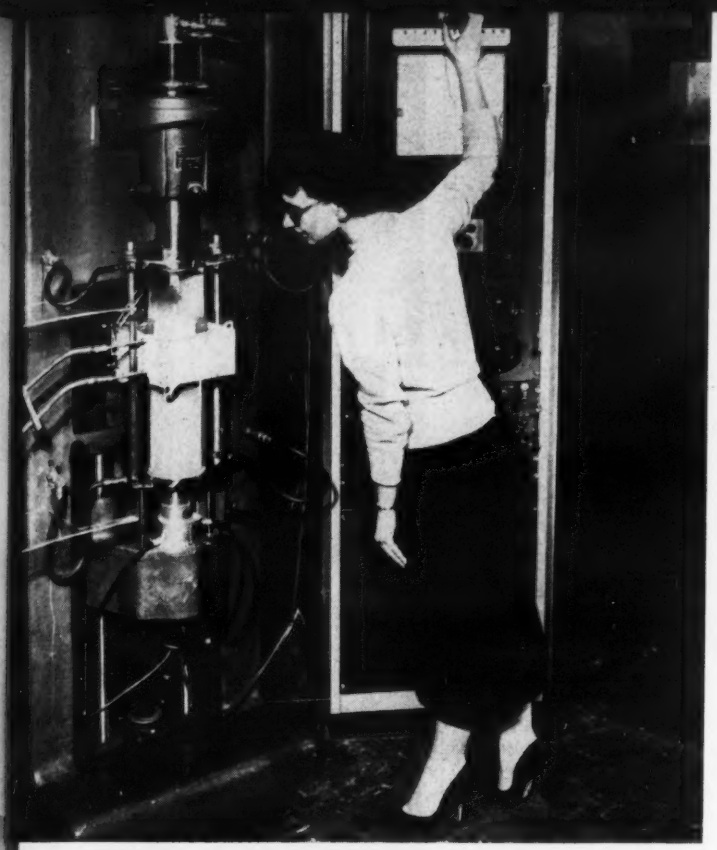
With a control system of three basic elements, package unit uses an induction heater regulated through a magnetic amplifier and saturable core reactors. Control system uses a radiant-heat-detector sighting on bottom of crucible, a recorder-controller with adjustable range and adjustable zero, and a control relay which delivers a 0- to 5-ma DC sig-



Typical crystal, approximately eight inches long, was grown with growing machine. Crystals up to eighteen inches long have been grown

Simplified schematic diagram of crystal-growing control unit





Operator adjusts temperature set-point on controller as she watches meniscus during growth of crystal. At base of crystal-growing chamber is radiant-heat detector which measures melting temp

nal to magnetic amplifier according to controller's error signal.

As even minor fluctuations in line voltage could upset the delicate balance, a secondary control has been added to circuit to compensate for these effects. In this circuit, a pick-up loop mounted near the induction coils continuously checks energy level delivered to melt. Changes cause a feedback signal to initiate corrective control action before melt temperature is affected.

Other Refinements

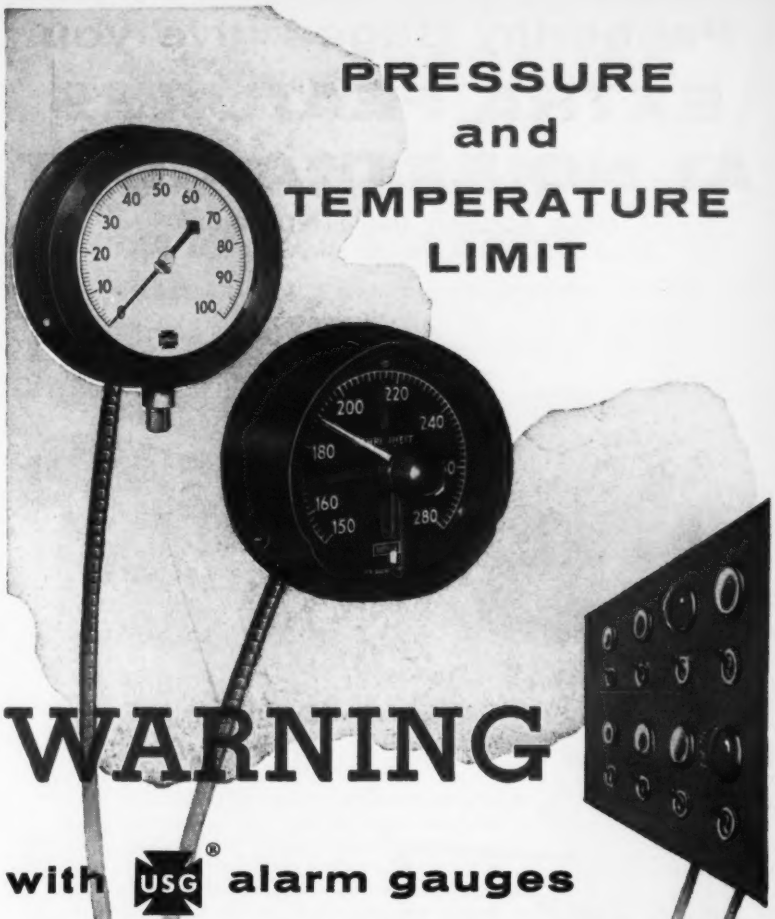
Sustained high accuracy and reliability in drawing uniform crystals are developed by other refinements in control system. A small flow of inert gas along sighting path of radiation detector clears away any dust or fumes and maintains accuracy of detector's optical system. A dry cell is used for recorder which produces a highly stable current output. Normal full-scale range of recorder-controller can be reduced from 100°C to only 60°C at crystal-growing temperature. Thus each scale division represents smaller increments and permits closer control.

Crystal Growing Process

Within the crystal-growing machine, a gas-filled chamber holds crucible of silicon or germanium to be melted. Above the crucible, a rod with

Instruments featured in petrochemical section

Since one outstanding characteristic of petrochemical plants is their tendency toward automatic operation — with high productivity and minimum manpower requirements — instrumentation stories will be an important part of the monthly petrochemical section starting in February — CHEMICAL PROCESSING.



These instruments provide a warning signal when temperature or pressure in a process rises or falls beyond predetermined danger limits.

Limit contacts are adjustable over the entire range with a "gap" as narrow as 2%. Suitable for lights, bells, buzzers or other signaling equipment requiring 0.1 amps or less. For larger alarm or relief devices, external relays can be furnished to increase rating to 6 amps.

Instruments may also be used as limit controls and as on-off controls when used in conjunction with lock-in relays and suitable delay tubes.

Available in cast iron or phenolic turret case in 12 pressure dial graduations from 0-30 lbs. to 0-10,000 lbs. Vacuum ranges 0-30". 5 compound dial graduations from 30"-30 lbs. to 30"-300 lbs. Thermometers available in all standard mercury, vapor and gas ranges with phenolic case only.

For complete details call your nearest USG distributor . . . see the "Yellow Pages" of your phone book . . . or write the factory for descriptive literature.

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MORE THAN 50,000 TYPES OF GAUGES • SUPERGAUGES • SOLID FRONT GAUGES • RECEIVER GAUGES • TEST GAUGES • RECORDERS • CONTROLLERS • TRANSMITTERS • PSYCHROMETERS • AVIATION INSTRUMENTS

Check 3050 opposite last page.

a seed crystal connects to motor-driven pulling apparatus. Procedure is to start a large single crystal growth from a small seed, drawing it continuously from melting silicon or germanium.

With seed in place, operator heats charge until it is thoroughly melted, to range of 1400°C for silicon and 950°C for germanium. This requires 15 to 20 minutes. Then the operator reduces power supplied to induction heating unit and watches surface of melt for first trace of cloudiness. By means of set-point control on recorder-controller, heat input is balanced to maintain this surface cloudiness.

Operator then lowers seed until it touches surface, and starts the puller, Shape of meniscus of surface is the guide. Both speed of pulling and temperature is adjusted by operator according to previous experience. Temperature control can be programmed by an automatic control unit as desired.

The crystal grows on itself as molten material crystallizes on solid surface of the seed crystal. Pulling takes from 60 to 90 minutes.

Results: With automatic temperature control system operating, temperatures are maintained within 0.25°C of the set point. With the difficult problem of accurate temperature control solved, crystal growing has become a routine production technique.

(Package control system for crystal-growing process is product of Leeds & Northrup Company, 444 North 16th St., Philadelphia 30, Pa.)

Check 3052 opposite last page.

Electronically measures flow through orifice, adapts easily

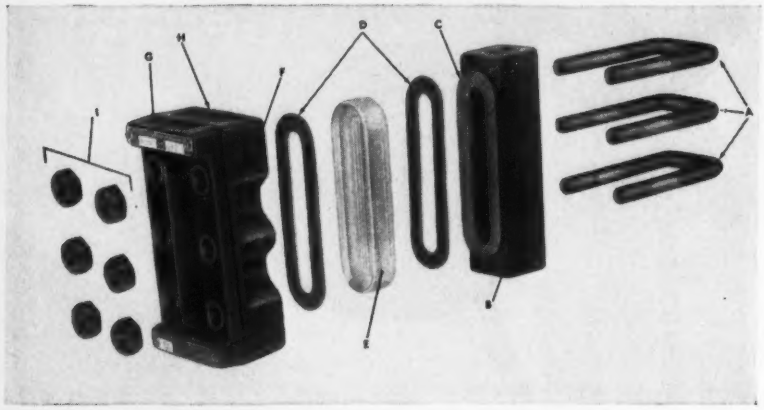
Measuring system and computer have no moving parts

Uses: Metering liquid and gas flows. Instrument can also be used to control flow, or operated as a monitor.

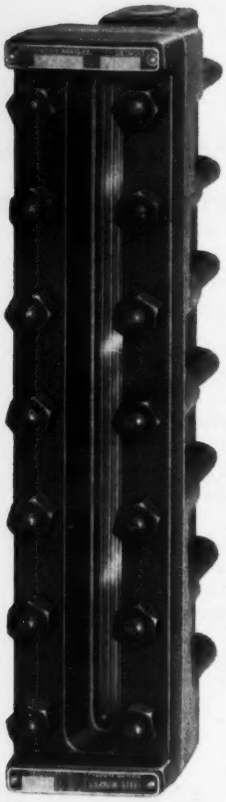
Features: Flow measuring system provides range, accu-

Penberthy Gages give you EXTRA FEATURES AT NO EXTRA COST

CLEAR, ACCURATE LIQUID-LEVEL READINGS in all tanks, boilers, vessels, containers, flow lines.



PENBERTHY REFLEX GAGES TYPE V & S



- **A** Alloy Steel Bolts for high temperature service.
- **B** Alloy Steel Liquid Chamber heat treated . . . no warping.
- **C** Raised Face on Liquid Chamber insures perfect self-alignment of frame with glass and gasket.
- **D** Composition Gaskets and Cushions are interchangeable.
- **E** Resilient Band around glass centralizes it at assembly.
- **F** Drop Forged Steel Frame extra heavy and rigid.
- **G** Extra heavy beam at end of Frame (prevents distortion).
- **H** Frame overlaps liquid chamber at all points.
- **I** Alloy Steel accurately threaded nuts.

The "inside story" of Penberthy Liquid Level Gage construction shows why you get positive-accurate readings at temperatures from sub-zero to over 1000° F; up to pressures exceeding 10,000 psi.

Exclusive features assure long service (at no extra cost) in all types of applications . . . even with highly corrosive and dangerous chemicals. Maintenance is much simpler; replacements and repairs made without removing assembly from vessel.

Proved through extensive use, Penberthy gage sets are available, in bronze, iron, carbon steel, stainless, monel and other materials . . . from stock or specially designed by gage engineering specialists.

Catalog 36 details complete line including accessories. Please send request on business letterhead. No obligation, of course. Order through your jobber or direct.

PENBERTHY MANUFACTURING COMPANY
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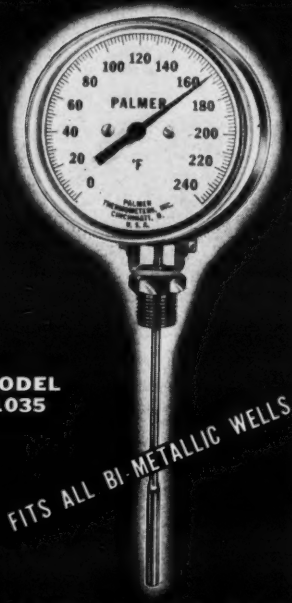
- EJECTORS
- EDUCTORS
- SYPHONS
- ELECTRIC SUMP PUMPS
- CYCLING JET PUMPS
- INJECTORS
- EXHAUSTERS

Check 3051 opposite last page.

Outstanding Accuracy PALMER Dial Thermometer



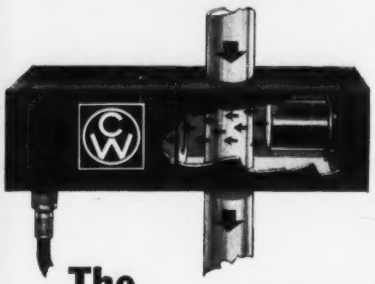
Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

PALMER THERMOMETERS, INC.
Mfrs. of Industrial Laboratory, Recording and Dial Thermometers
2515 Norwood Ave., Cincinnati 12, O.

Check 3053 opposite last page.

for CONTINUOUS PROCESS DENSITY MEASUREMENT



The Curtiss-Wright Non-Contact DENSITY GAUGE

To measure the density of moving liquids, gases, slurries and powders in pipes or tubes or on conveyors, Curtiss-Wright DG3 Density Gauge utilizes controlled nuclear rays to provide accuracies of better than ±1% in density measurement.

The small, compact measuring head is designed to fit various pipe sizes; it can be mounted on the line while remaining circuitry can be remotely placed at regular plant control stations. Highly stable, the measuring system employs direct AC amplification and will measure with a resolution of ¼% over a range of 0.5-1.5 gm/cm³.

The DG3 system features standard interchangeable component drawers for easy, economical maintenance. Choice of dial indication or standard strip chart recorder presentations. The system may be combined with the Curtiss-Wright Proportional Automatic Controller to automatically adjust mixture ratios.

Complete information on the Curtiss-Wright Density Gauge available on request.

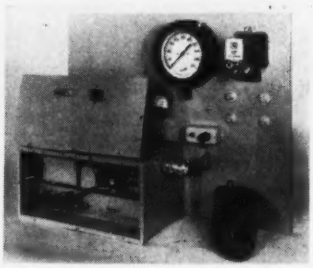
INDUSTRIAL CONTROL SALES

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION · CARLSTADT, N. J.

Check 3054 opposite last page.

racy, with high speed response. Instrument is accurate to within one percent of full scale output with 20 percent or more flow.

Description: Instrument measures flow of gas through an orifice plate by means of electrical signals proportional to flow rate and accumulated flow. An adapter adjusts instrument's calibration to conditions of measurement problem. Adjustments are easily made by changing "plug-in" adapter.



Flow measuring system operates electronically

Computer contains magnetic amplifiers, silicon diodes, and transistors. It does not contain any moving parts nor does it generate a large amount of heat. It has a pressure compensation input range of 0 to 120 per cent and a differential range of 0 to 100 percent. Instrument has speed of response of three-hundreds of a second for 63.2 percent of full scale change.

Accumulated volume can be recorded on a strip chart.

(Flow meter is product of Computers, Inc., 2025 Harold St., Houston 6, Texas.)

Check 3055 opposite last page.

Conductivity recorder is transistorized

Chart drive uses clockwork mechanism

Uses: Recording electrolytic conductivity at locations where electrical power is not available.

Features: Conductivity recorder is transistorized to minimize battery drain.

Description: Electrolytic

BURRELL *"For Scientists Everywhere"*

STANTON

Thermo-Recording Balance

A superior laboratory balance that heats, weighs and records simultaneously.

"Heat-to-constant-weight" is accomplished easily in research or for process control.

STANTON Thermo-Recording Balance, Model TR-1 Electric weight loading, twin electronic recorder and standard furnace with simple program control. A cam, which can be modified, provides uniform rate of heating. Sensitivity 1 mg.

Burrell Cat. No. 2-569-41 . . . . . $4,550.
Price listed is F.O.B. Pittsburgh, Pa.

Other models are available for thermo-recording or recording only with sensitivities of 1 mg. or 0.1 mg.

Ask for Bulletin No. 329

BURRELL CORPORATION
Scientific Apparatus and Laboratory Supplies
2223 FIFTH AVENUE, PITTSBURGH 19, PA.

Check 3056 opposite last page.

conductivity recorder is battery operated. Chart drive has clockwork mechanism. Unit uses circular charts, with wide variety of chart speeds available. Instrument uses AC Wheatstone Bridge self-balancing principle with bridge frequency of 1000 cps. Normal battery complement, two 6-volt batteries, should be sufficient for two months of continuous operation. Battery packs can be supplied either of dry cell or rechargeable design.

Instrument is direct reading in micromhos. Automatic or manual temperature compensation can be supplied. Unit is housed in aluminum carrying case with handle. Case is gasketed and of splash-proof construction.

(Battery-operated conductivity recorder is product of Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, Essex co., N. J.)

Check 3057 opposite last page.

Fast dual-pen recorder is small, portable

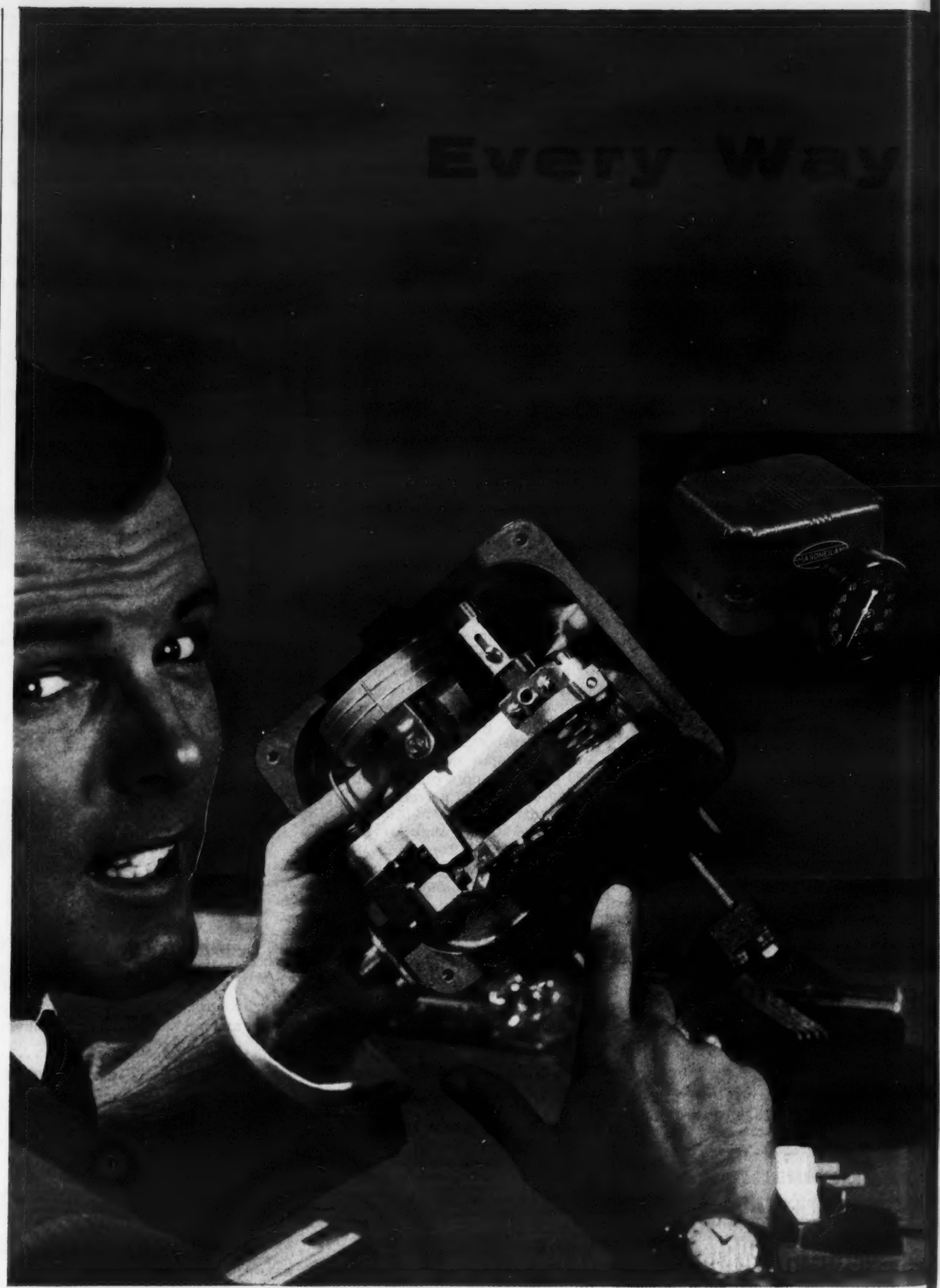
Each pen has full-scale response time of 0.25 sec

Uses: Light-weight, dual-pen, strip-chart recorder is suitable for varied applications, both process and general laboratory.

Features: Each pen has a full-scale response of 0.25 second with negligible overshoot.

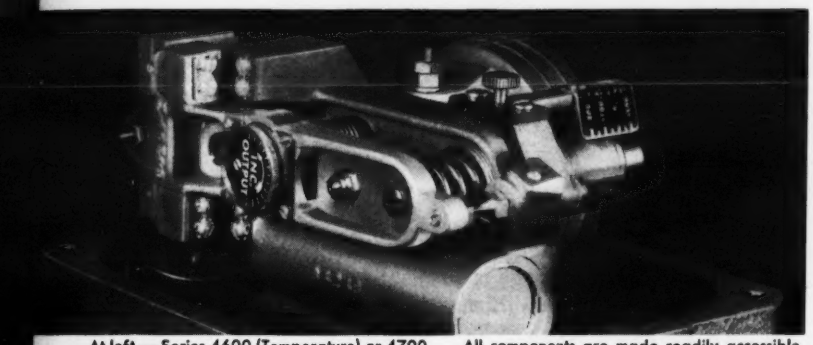
Description: Instrument is transistorized for increased reliability. Many components of recorder are hermetically sealed or totally enclosed to minimize difficulties caused by dust and moisture. Recorder is built around a cast-aluminum framework, capable of withstanding severe vibration and mechanical shocks. Case is gasket-sealed. Signal and power corrections are made through military-type waterproof connectors.

Two pens share width of 5" chart. These are mounted in line to provide correlation of measurements recorded. Span of either pen may be adjusted to occupy from 25 to 75% of



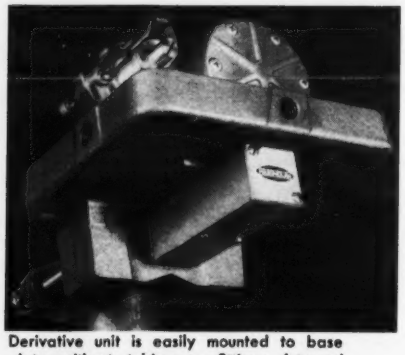
You Look At It!

New Masoneilan Transmitter Offers High Performance, Ease of Installation and Maintenance



At left — Series 4600 (Temperature) or 4700 (Pressure) Transmitter is housed in a weatherproof aluminum case, with blue Hammertone finish. Weighs only about 8 lbs.

All components are made readily accessible by simply removing the cover. Simple, unitized construction makes everything compact, yet easy to adjust and maintain.



Derivative unit is easily mounted to base plate without tubing or fittings. Integral mounting of receiver gauge on front edge of base plate is also optional.

One look at the Masoneilan Temperature or Pressure Transmitter will show you its simple, compact and rugged design. All of the elements have been neatly tailored into a 7″ x 6″ area, only 3¾″ high; yet all adjustments are visible and easily accessible — performance is accurate and dependable.

Unitized construction is a major advancement. All sub-assemblies can be easily changed or removed individually, without disturbing the beam assembly. And the Derivative unit and Receiver Gauge may be integrally mounted on the base plate, requiring no tubing or fittings.

The new Masoneilan Transmitter is easily and quickly mounted to a pipe or flat surface — in any position found convenient, because the balanced beam eliminates zero shift.

This is your kind of instrument — built for dependable operation and easy maintenance! Send for new Bulletin which provides complete data and specifications.

MASON-NEILAN

Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

SEVENTY-FIFTH ANNIVERSARY

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Albuquerque • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • Pittsburgh
New Orleans • Seattle • Jacksonville • Wilmington • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

MN7-32

Check 3058 opposite last page.

chart width, with second pen occupying remainder. Sensitivity is 10 mv full scale for either channel when span adjustment of each pen covers one-half chart width.

Equipped with a handle on the carrying case, the recorder is 10 x 10 x 15″. Weight is 23 lb.

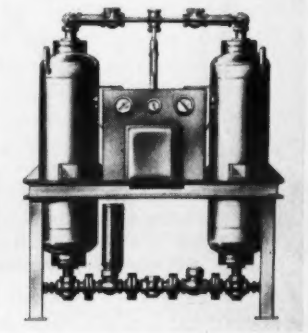
(Model 200 recorder is product of Mount Sopris Instrument Corporation, 1320 Pearl St., Boulder, Colorado.)

Check 3059 opposite last page.

Desiccant gas dryer is reactivated without heat

Uses: Supplying clean and dry instrument air for pneumatic instrument operation.

Features: Desiccant gas dryer is reactivated without heat, completely automatic.



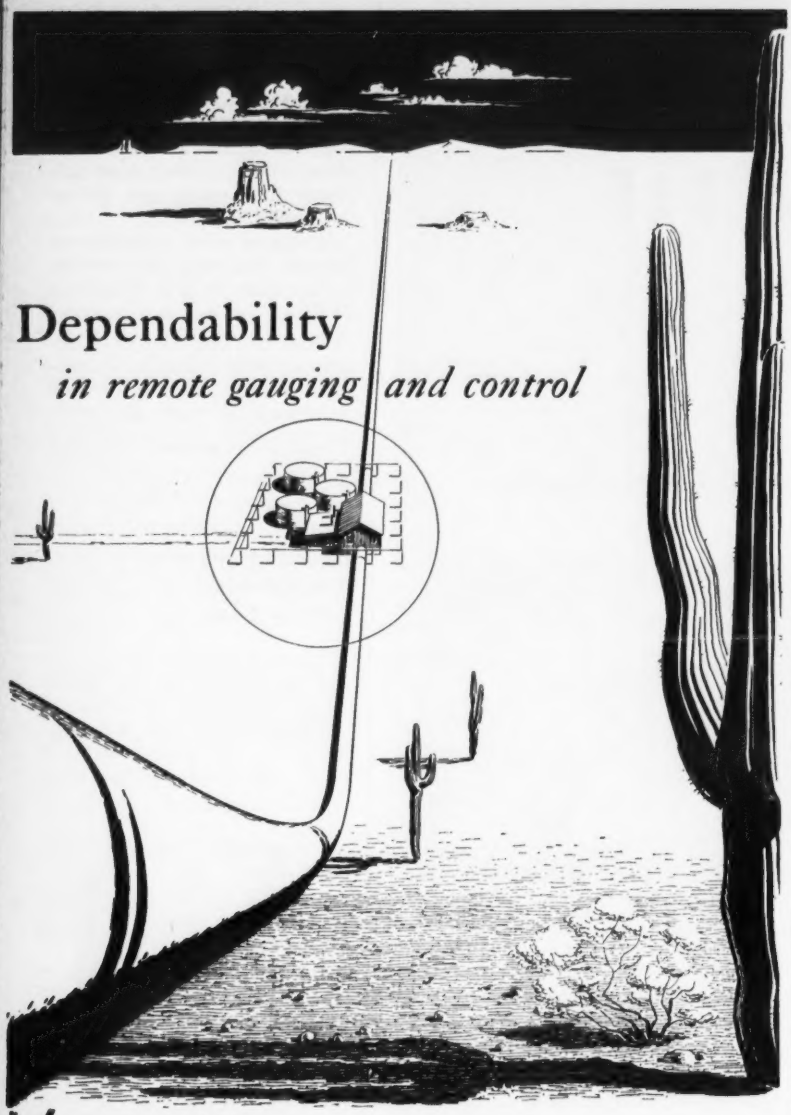
Desiccant dryer for instrument air is reactivated without use of heat

Description: Dryer has two chambers, each filled with a solid desiccant. Unit operates by utilizing property of desiccant to come into equilibrium with its surroundings, using a recycled gas stream to accomplish this purpose.

Models of dryer will handle flows from 2 to over 1800 standard cfm. Effluent dewpoints of −100° to −140°F can be provided continuously.

(Industrol Heat-les Dryer is product of Trinity Equipment Corp., 472 Westfield Ave., E., Roselle Park, N.J.)

Check 3060 opposite last page.



Dependability
in remote gauging and control

"Varec" PULSE CODE TELEMETERING

ISOLATED LOCATIONS, such as this lonely pumping station, provide the acid test for remote control gauging and operating equipment. Prolonged exposure to the ravaging effects of sun, wind, sand and rapid temperature changes demands the absolute best in the design and manufacture of all equipment. There is never room for costly compromise.

"Varec"-equipped pipelines and refineries all over the world, operating automatically and efficiently, have proved the economic practicability of remote controlled gauging and operation. There are "Varec" models for automatic scanning and data printing, manual scanning, temperature reading and recording, automatic or manual actuation of valves, pumps and other field equipment, and automatically-controlled tank switching. "Varec" PULSE CODE always reads safe — if a pulse is lost or gained you get no reading, not an incorrect reading.

There are "Varec" models to perform many necessary functions involved with the operation of flow tanks, pumping stations, tank farms, and refineries automatically, economically, and dependably. For amazingly fast pay-out, automate with "Varec" — the pioneer and leader for over 30 years.

Write for Bulletin CP-3012 for full details on "Varec" PULSE CODE Telemetering.

"Varec"

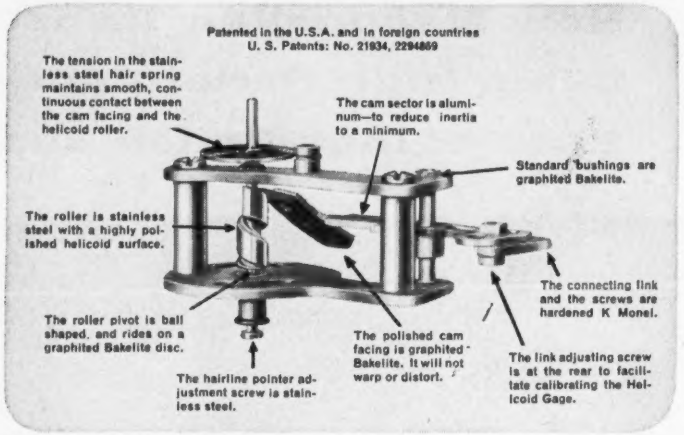
The VAPOR RECOVERY SYSTEMS COMPANY
Compton, California, U.S.A.
Cable address: Varec Compton Calif (U.S.A.) All Codes
961-24

Check 3061 opposite last page.

ACCO Helicoid Gage U.S.A.

Nothing but the best in gages for working pressures from 30" vacuum to 10,000 p.s.i.

These details of Helicoid gage design assure longer life and enduring accuracy


Patented in the U.S.A. and in foreign countries
U. S. Patents: No. 21934, 2294869
The tension in the stainless steel hair spring maintains smooth, continuous contact between the cam facing and the helicoid roller.
The cam sector is aluminum—to reduce inertia to a minimum.
Standard bushings are graphited Bakelite.
The roller is stainless steel with a highly polished helicoid surface.
The connecting link and the screws are hardened K Monel.
The roller pivot is ball shaped, and rides on a graphited Bakelite disc.
The polished cam facing is graphited Bakelite. It will not warp or distort.
The link adjusting screw is at the rear to facilitate calibrating the Helicoid Gage.
The hairline pointer adjustment screw is stainless steel.

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown above. Such Helicoid features—protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation.

The Chemical Gage

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm.

Tubes built for millions of pressure pulsations

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials —alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.

For complete information on the Helicoid line of gages write for **Catalog G-52**

Helicoid gives you all these features at prices that are competitive in the quality gage field.

Helicoid Gage Division
AMERICAN CHAIN & CABLE
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ACCO TRADE MARK

Check 3062 opposite last page.

Would you like to receive CHEMICAL PROCESSING personally?

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If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

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Main Products .....

Transistorized control

Transistorized audio-tone transmission as used in supervisory control systems is covered in four page bulletin. Design features, operational data, characteristics, and specifications of these units as applied to telemetering and control are covered. Bul 240-P4 — Builders-Providence, Inc., Div. of B-I-F Industries, Inc., 345 Harris Ave., Providence, R. I.

Check 3063 opposite last page.

Ultrasonic level gage eliminates need for floats

Device is transistorized for reliability

Uses: Accurately gaging true liquid levels in storage tanks and Dewar vessels for corrosive chemicals, liquefied petroleum gases, cryogenic liquids.

Features: Ultrasonic liquid-level gage completely eliminates need for floats, leakages, any moving parts.

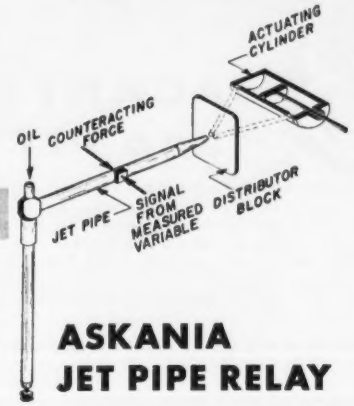
Description: Using ultrasonic pulse-ranging principle,

Ultrasonic level gage reads liquid level directly in feet

instrument reads liquid level in feet directly on a large meter. With two ranges, meter will accommodate tanks up to 15′ high. Built-in calibration allows correct level reading despite changes in velocity of sound propagation caused by varying temperatures, specific gravities, similar differences between liquids gaged.

One indicator will gage as many as six transducer-equipped tanks within radius of 1500′. Additional tanks may

Key Component for Those Tough Control Jobs



THE ASKANIA JET PIPE RELAY

for Pressure • Flow • Proportioning Combustion • Position

The Askania Jet Pipe Relay, nucleus of Askania Controllers, is designed and built for the TOUGH control jobs. You can depend upon it for the operation of LARGE, HEAVY valves, dampers, engine throttles and other final control elements or those having high thrust requirements.

The Askania Jet Pipe Relay provides double acting positive correcting power which opens and closes the valve without the need of a spring return.

Ruggedly constructed, Askania Jet Pipe Control systems are used for flow, pressure, proportioning and combustion control applications. Askania Jet Pipe Controllers

- operate equally well indoors and outdoors—won't freeze
- operate even under the most adverse ambient conditions
- are easily installed
- require minimum maintenance
- give instantaneous response to minute changes in the measured variable

Send for General Catalog—which describes and illustrates how Askania Jet Pipe Regulators can be applied to various process applications...shows you the solution to your own tough control problems. Write Askania Regulator Company, 242 E. Ontario St., Chicago, Ill.

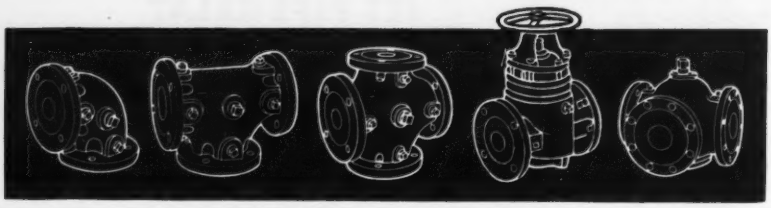
ASKANIA REGULATOR COMPANY
"CONTROLS FOR INDUSTRY"
Hydraulic, Electrohydraulic and Electronic Controls—Valve Actuators and Cylinders—General System Engineering
A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION
GPE

Check 3064 opposite last page.

H&B JACKETED PIPE and FITTINGS

● The above cutaway illustrates H & B standard jacketed welded pipe and fitting construction, designed to allow complete jacketing of the product pipe. Special jigs and fixtures enable H & B to insure complete uniformity of the jacket area in relation to the O D of the product line and the I D of the jacket pipe. All H & B jacketed equipment is hydrostatically tested at 450 to 500 p.s.i. H & B welded steel jacketed fittings are ideally suited for process piping of pressures reaching 300 p.s.i. and temperatures up to 750°F.... A few of these fittings and valves are illustrated below. For more information send for bulletin J-57.

HETHERINGTON & BERNER INC. • 711 KENTUCKY AVE., INDIANAPOLIS 7, IND.



Check 3065 opposite last page.

be handled by using auxiliary switch. Indicator is transistorized for maximum reliability and consumes only 5 watts of 120-volt, 60-cycle power. Power at the tank is not required.

(Model 300 ECHOGAGE is product of Bogue Electric Manufacturing Company, 52 Iowa Ave., Paterson 3, N.J.)

Check 3067 opposite last page.

Sp gr measurement

Differential converter specific gravity transmitter, with range continuously adjustable from 0-5 to 0-25 inches of water, is described and illustrated in four-page data sheet. It is adaptable to continuous measurement and control of specific gravity of liquids in open vessels. Instrumentation data sheet 10.14-8 — Industrial Div., Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia 44, Pennsylvania.

Check 3068 opposite last page.

ALLIED RADIO
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FREE! send for the most widely used
ELECTRONIC SUPPLY GUIDE
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COMPLETE 404-PAGE
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your best buying guide to the world's largest stocks of
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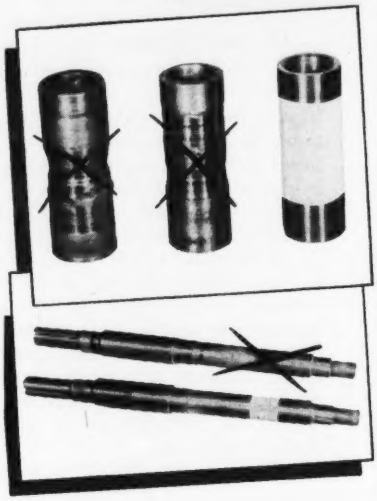
Simplify and speed your purchasing of electronic supplies and equipment: send your orders to us for fast shipment from the world's largest stocks of electron tubes (all types and makes), transistors, test instruments (see our money-saving KNIGHT-KITS), audio equipment and electronic parts. Our expert Industrial supply service saves you time, money and effort. Send today for your FREE 1958 ALLIED Catalog—your complete Buying Guide to quality Electronic Supplies for Industrial and Communications use.
ALLIED RADIO
100 N. Western Ave., Dept. 72-A8
Chicago 80, Illinois
our 37th year
Send for FREE catalog

Check 3066 opposite last page.

"I said hand me the torch . . . over the top, stupid!"

Eliminate "CHEWED UP" SHAFTS with CHEMPRO NEW SPRAYED CERAMIC SERVICE



Chempro's new extremely hard, chemically inert ceramic coatings applied to shafts and shaft sleeves eliminate the costly failure of "chewed up" or "scored" shafts and sleeves. Sprayed ceramic surfaces are highly resistant to abrasion, erosion and fretting corrosion under even the most difficult slurry service. They also give ideal protection against shaft wear under high packing gland pressures.

Pump down-time due to shaft or sleeve failure has been drastically reduced in every installation in which Chempro's sprayed ceramic surfacing has been used.

Write for new Chempro Bulletin CP28 for ordering information.

CHEMICAL & POWER PRODUCTS, Inc.
9 Broadway, New York 4, N. Y.

Check 3069 opposite last page.

Gas density balance will continuously control process

Uses: Continuous density measurements of process streams where specific gravity or density provide an index to gas stream properties.

Features: Gas density balance has quick response. A 95% response is obtained in less than one minute.

Description: Instrument uses null-balance effect. Small dumbbell is supported on a horizontal quartz fiber. One ball is punctured so it will not experience any buoyancy effect. Second tends to rise or dip as density of gas increases or decreases.

Magnitude of change is proportional to density of sample gas. Sensitivity is ½% of full scale. Accuracy is 1½% of full scale. Ranges of 0.05 total span relative to air from 0 to 5.000 are available. Standard output is 0-5 millivolts.

Instrument is built into a vapor-tight steel case. Range selector switch and operating controls are mounted on door.

(Gas density balance is product of Beckman Process Instruments Div., Fullerton, California.)

Check 3070 opposite last page.

'Because of simplicity,' surface-speed-test was installed

Problem: Failure to maintain absolutely uniform speed in "padding" — impregnating cloth with vat dye stuffs — at Hudson Piece Dye Works, Paterson, New Jersey, results in non-uniformity of shades, even within the same run. Runs of rayon, nylon, Dacron, Orlon, silk, and cotton are frequently 16,000 to 20,000 yards long.

It is also essential that shades be duplicated exactly. Speed of padding must therefore be the same as during previous runs.

Another operation requiring highly critical speeds involves finishing and curing. Finish — "feel" — of different

Severe Problems of Handling Chemicals Solved with Aeroquip 2802 Hose Lines of TEFLON*

You Reduce Maintenance Costs Because Aeroquip "*super gem*" Fittings are Reusable

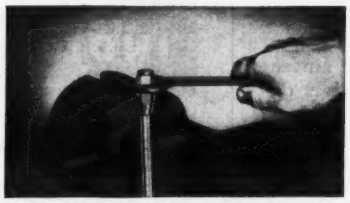
Example: Methylene chloride is essential in the processing and packaging of insecticides and other compounds by Connecticut Chemicals (Canada) Ltd., Toronto, producer of aerosol products . . . but it's notoriously tough on all kinds of hose lines, except one—

AEROQUIP 2802 HOSE LINES OF TEFLON!

In more than a year of service, Aeroquip Hose Lines of Teflon have performed flawlessly for Connecticut Chemicals. They are excellent for use with methylene chloride as well as other chemicals and fluids for these reasons:

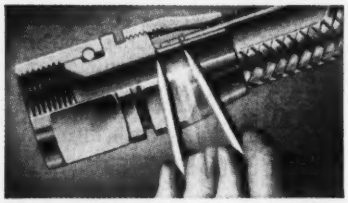
Chemical stability prevents deterioration and flaking of hose. *Chemical inertness* prevents contamination when changing from one product to another. *Lubricity* assures good drainage and flushing of lines. *Wide temperature range* accommodates —100°F to +500°F. *Flexibility* of hose allows various connections for quick conversions.

Aeroquip's corrosion-resistant, stainless steel "*super gem*" Fittings are the only detachable, reusable fittings for hose lines of Teflon. By reusing them to make replacement lines, a substantial portion of total hose line cost can be saved. The Aeroquip Distributor listed in your Yellow Page Telephone Directory has complete information, or send us the coupon below.



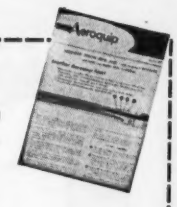
Only Aeroquip Hose Lines of Teflon can be assembled by hand with such simple tools as a wrench and a vise. You make on-the-spot replacements from a small inventory.

*DuPont trade name for its Tetrafluoroethylene resin.



Leakproof, too! Unique "*super gem*" Fitting design provides metal-to-metal line seal (left) and lip seal (right) for perfect sealing at all pressures up to 1500 psi.

"*super gem*" is an Aeroquip Trademark.



Aeroquip Corporation
Jackson, Michigan

Please send me the following information on reusable "*super gem*" Fittings and Hose of Teflon:

☐ Industrial Engineering Bulletin IEB-26A.
☐ Aircraft Engineering Bulletin AEB-13.

Name_____
Title_____
Company_____
Address_____
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Aeroquip

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AEROQUIP CORPORATION, JACKSON, MICHIGAN

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MARMAN DIVISION, LOS ANGELES, CALIF.; GENERAL LOGISTICS, PASADENA, CALIF.; AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO.

Check 3071 opposite last page.

Lumenite

AUTOMATIC CONTROLS

ELECTRONIC LIQUID LEVEL
INDUSTRIAL TIMERS
TIME SWITCHES
MAGNETIC SWITCHES

Ask for Bulletin

FL—Liquid Level
FM—Milk Level
FN—Nonconductive Liquid
ITC—Ice Thickness
BH—Boiler Level

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LT—Time Switches
PC—Program Clocks
CR—Cycle Repeaters
R—Time Delay Relay
RMC—Automatic Reset

Lumenite Electronic Company
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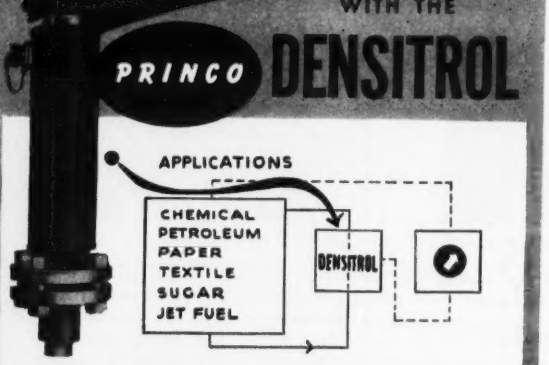
GET automatic LIQUID DENSITY CONTROL WITH THE PRINCO DENSITROL



The DENSITROL is an extremely accurate, sensitive instrument for continuously, accurately and automatically controlling or recording the blending, mixing, separation, dilution or concentration of industrial process liquids. It quickly pays for itself because it eliminates operator attendance and does on a continuous basis what formerly was done on a batch basis.

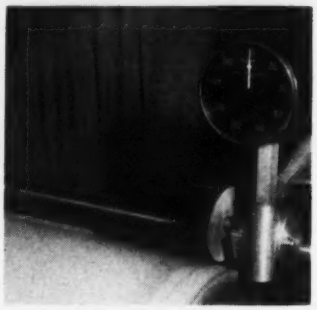
For ranges, calibrations and other specifications, write, wire or call.

PRECISION THERMOMETER & INSTRUMENT CO.
1434 BRANDYWINE STREET · DEPT. CP · PHILA. 30, PA. · RI 6-6671

Check 3073 opposite last page.

lots must be uniform. In the anti-crease process, finish must be cured exactly in the right length of time to protect against fiber degradation.

Operating speeds were controlled by two systems. In padding, foremen would run material through the machine,



Surface speed-indicator, installed above roller, derives speed directly from material itself

adjusting electric speed-control until yardage-per-minute was correct. Control point was marked in pencil on board, and switch was kept at this point throughout run. Whenever same fabric was rerun, control would be moved to same point. An electric impulse speed-indicator was used to control finishing.

Solution: "Because of simplicity, ease of installation, and accuracy," Hudson installed a surface speed-indicator on both padding and finishing machinery.

Advantage of the surface speed-indicator is that it derives its speed directly from material itself or from surface on which material is moving. indicator does not rely on shaft or gears which may be inaccurate.

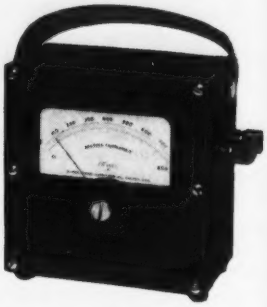
Results: Installation of the surface speed-indicator has improved padding operation to point where shades are consistently uniform throughout the entire run. Control of speed in finishing operations has resulted in a uniform finish from piece-to-piece and lot-to-lot.

(Surface speed indicator is product of Jones Motrola Corp., 430 Fairfield Ave., Stamford, Conn.)

Check 3074 opposite last page.

ACCURATE PORTABLE

Alnor PYROMETER TYPE 1500



Checking temperatures of electric heating mantles is but one of the many laboratory temperature jobs performed with consistent accuracy within ¾ of 1% full scale—under all conditions.

Sturdy case protects precision meter movement in portable use. Direct reading scale face can be quickly read at distance—no slide wires or conversion tables needed. Available in ten scale ranges from 0-400° to 0-3000° F. or centigrade equivalents.

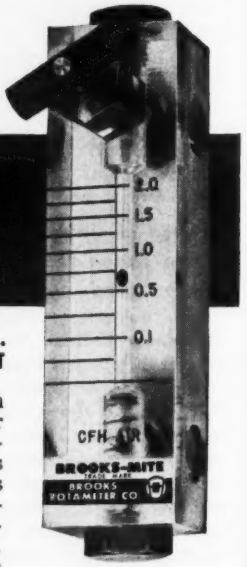
Get full details on the Type 1500 in Bulletin 4434. Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Check 3075 opposite last page.

it's plastic and it's practical...

SMALL FLOW INDICATOR



NEW BROOKS-MITE DESIGN... RUGGED... AT LOWEST COST

Here's the well-known BROOKS-MITE Flow Indicator with the new "O" ring construction. Torque limitations of the past are overcome. This is your best meter where rugged service and need for *lowest possible cost* go together.

The BROOKS-MITE has an acrylic plastic meter body and is available in 24 flow ranges. Optional features include a built-in FLO-MITE needle valve and integrally piped constant differential relay.

Send For Bulletin No. 120

BROOKS ROTAMETER COMPANY
158A STREET · LANSDALE, PA.

Check 3076 opposite last page.

Now—the 1st continuous analyzer monitors a production line

introducing
ARL's **QUANTROL*** a great forward step in process control

The Quantrol, employing x-ray fluorescence, provides continuous, nondestructive analysis of any one of a large number of chemical elements. Working over an extremely wide range of concentrations, it is suitable for such diverse uses as continuously measuring tin and zinc coating weights on steel strip—uranium content in zirconium strip—zinc, copper, nickel, or iron content in ore tailings, concentrates, or slags—inorganic elements in process streams—heavier elements in glasses, cements, and pigments—sorting of parts by alloy type—thickness gaging of unusual materials. In fact, its application in process control is almost limitless.

The Quantrol is rugged and reliable, designed and built to operate on production lines. Process behavior is continuously recorded on the chart in units common to your industry. ARL's exclusive ratio technique cancels out many variables which limit the usefulness of other process controls.

ARL's New Systems Division will help you apply the Quantrol to your process and bring automation one step closer. Please write about your problem so that full information can be supplied by ARL's systems engineers.

*TRADE MARK

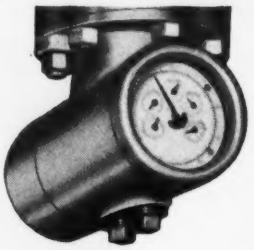
Applied Research Laboratories
SPECTROCHEMICAL EQUIPMENT
3717 PARK PLACE • GLENDALE 8, CALIFORNIA
NEW YORK • PITTSBURGH • DETROIT • CHICAGO • DALLAS • LOS ANGELES • LAUSANNE, Switzerland • LONDON, England

Check 3077 opposite last page.

STOP STEAM GIVE-AWAY

with this Pressure-Compensated Counter

. . . for users of Builders-Providence Shuntflo® Steam Meters.



NEW UNIT makes the Shuntflo EVEN BETTER!

PRESSURE COMPENSATION provides a meter reading which is continuously and automatically corrected for line pressure variations.

SELF-OPERATED, self-contained counter unit soon pays for itself in savings realized.

EASILY INSTALLED on all models of the service-proven Shuntflo.

PROVIDES closer accounting of steam consumption by area, building, or process.

INVESTIGATE this PRESSURE COMPENSATED COUNTER which comes as a "complete package" . . . ready to start adding up *steam savings* for you!

A NEW STAR in steam metering, this unit offers a wide range of correction in either direction (above or below) or both directions from normal pressure. It is also available with contacts for electrical operation of remote totalizers, demand meters, and recorders.

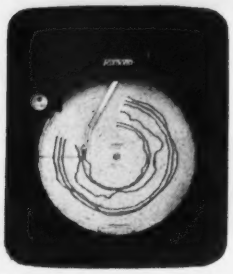
FREE BULLETIN shows how easy it is to install this unit and change your steam losses to profits. Request your copy of Bulletin 400-P1 today! Write Builders-Providence, Inc., 387 Harris Avenue, Providence 1, R. I.

BUILDERS-PROVIDENCE
DIVISION OF
B-I-F INDUSTRIES
METERS FEEDERS CONTROLS

Check 3078 opposite last page.

GET THE BEST SOLUTION TO ANY TEMPERATURE

from –450°F

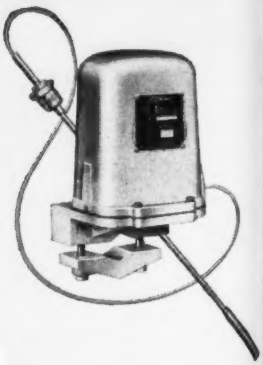


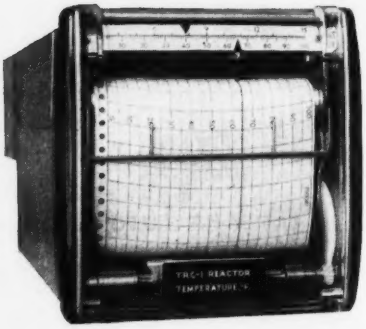
Dynalog Electronic Instruments

Complete line of indicators, recorders, and controllers employing the advanced Dynalog measuring system in which a friction-free air capacitor replaces conventional slidewire — provides continuous, stepless balancing action. Dynalog Instruments provide up to six records on a single round chart. For use with resistance or voltage type primary elements — pneumatic or electric control action.

Multi-Record Dynalog

- 6 color-coded temperature records on one round chart.
- Each record line a distinctive, non-smudging color.
- No slidewire — no batteries — no standardizing.
- Thermocouple or resistance bulb types.





Consotrol® Recording Control Station

One of the complete Consotrol line of compact panel indicators, recorders, and controllers. This advanced control station features full 4" chart and scales, six-months' ink supply, bumpless auto.-man. transfers. The M/58 Consotrol Controller, shown here integrally mounted, provides:

- All four control actions, with two reset ranges, easily adjustable to widest variations in operating conditions.
- Easy lever-setting proportional band, calibrated to 500%.
- High sensitivity and precision due to unique "floating disc" balancing action — even at widest settings of proportional band.
- Interchangeable "plug-in" components.
- Continuously variable reset resistance gives 500:1 rangeability.

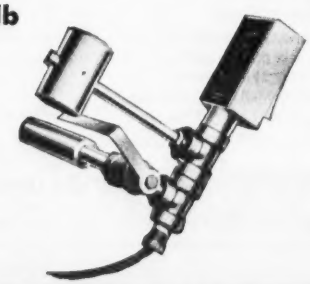
PRIMARY ELEMENTS

A complete selection of primary elements, including filled thermal systems, resistance bulbs, and thermocouples. Besides these standard types, special elements and accessories are available to meet the requirements of practically any industrial temperature problem.

Dynatherm Resistance Bulb

For use with Dynalog Electronic Instruments.

- Superior measurement performance for temperature up to 600°F.
- Fastest response due to positive metal-to-metal end contact with standard wells or sockets.
- Highest sustained accuracy. Permits use of extra-narrow scales — ideal for precise temperature difference measurements.



Roll Surface Temperature Element

- Continuous, automatic measurement or control of roll surface temperatures up to 450°F.
- Extra-rugged construction — with a "feather" touch. Won't mark or score the roll.
- Eliminates friction, radiation, and convection errors.
- Simplest, most accurate way to measure roll surface temperatures.

ro Instrumentation

Whenever you have a temperature problem in the −450°F to +2800°F range, you can depend on Foxboro Instrumentation for the best solution. Foxboro's outstanding combination of truly advanced instruments and unequaled experience in applying them, has successfully solved temperature problems as widely different as helium liquefaction and jet engine testing.

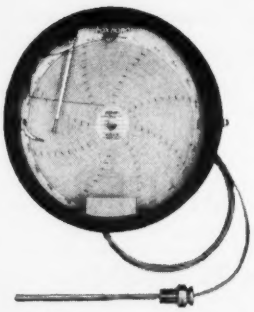
Foxboro offers a wide variety of primary elements, transmission devices, indicators, recorders, and controllers. Whether a single instrument or a combination is required — filled-system, electronic, or electric — you can be sure of fitting the process *exactly*. Unique Foxboro developments, such as Dynalog* Electronic Instruments, Dynatherm** Resistance Bulbs, and the 12A Temperature Transmitter, continually maintain control standards in step with every advance of modern processing.

A few of the instruments which typify Foxboro's better-engineering are shown on these pages. Chart below shows complete temperature ranges covered by Foxboro measuring systems. Write for complete details. **The Foxboro Company, 811 Neponset Ave., Foxboro, Massachusetts.**

FOXBORO
Reg. U.S. Pat. Off.
TEMPERATURE
measurement and control

Type 12A Temperature Pneumatic Transmitter

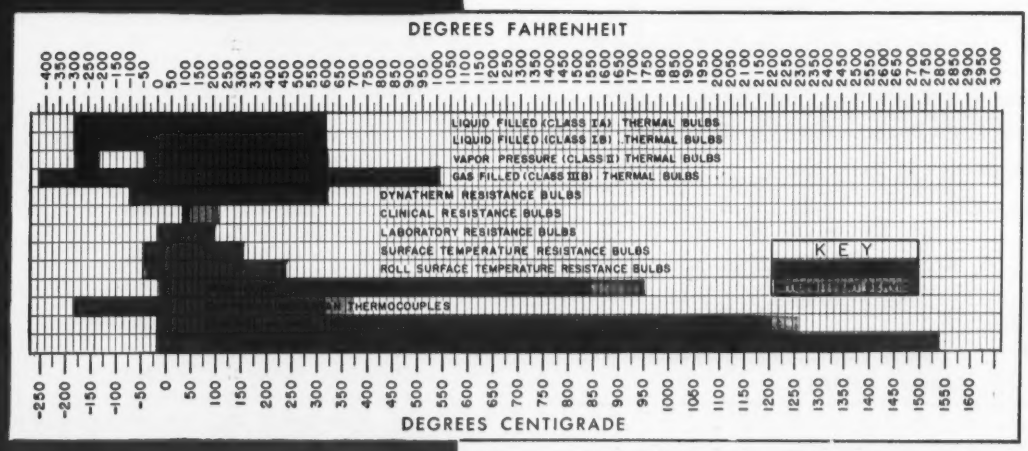
- Simple way to measure remote temperatures in the −100°F to +1000°F range. Operating spans of 50°, 100°, 200°, and 400°F.
- Compensated for ambient temperatures and pressures.
- Compact, easily installed. Uses regular ¼" O.D. tubing transmission lines — no troublesome conduits, no costly capillary tubing.
- Suitable for any hazardous, corrosive, or outdoor location.



Filled Thermal System Instruments

- Give highly accurate, "lifetime" service within range of −450F to +1000F.
- Most economical of all temperature measuring systems. Require no maintenance under normal operating conditions.
- Available as liquid filled, vapor pressure, or gas filled systems.
- Complete line of indicators, recorders, and controllers in rectangular or circular case models.

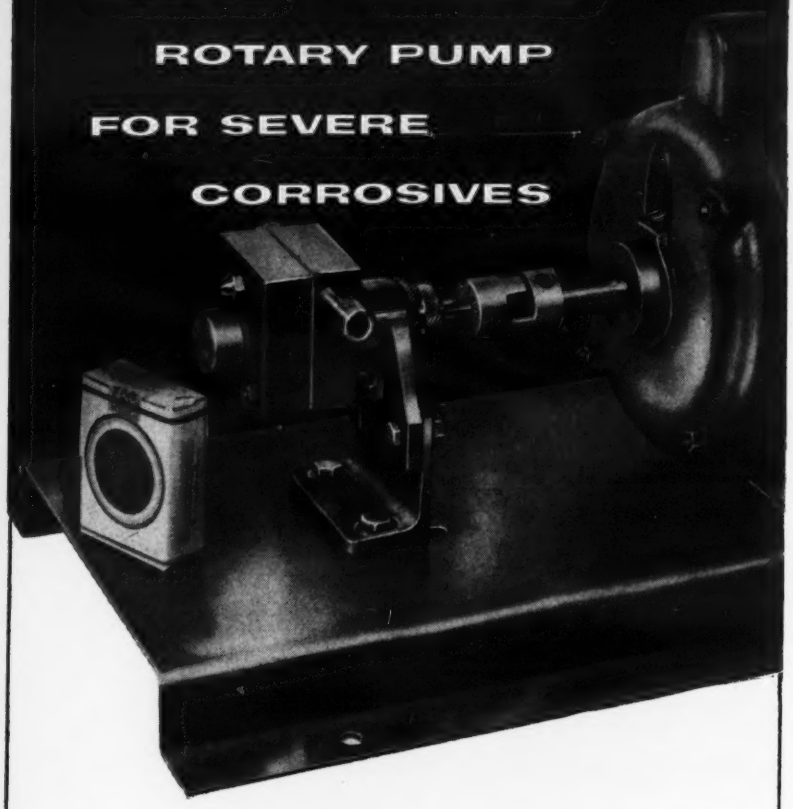
Locate your problem temperature in this table



*Reg. U.S. Pat. Off. **Trademark

For more information on product at left, specify 3079 see information request blank opposite last page.

NEW "MINILAB" ROTARY PUMP FOR SEVERE CORROSIVES



ONLY $200 FOR HASTELLOY C AND TEFLON CONSTRUCTION

For applications from 0 to 2 gpm, here is a self-priming pump designed for the most severe corrosive service in laboratory and pilot plant installations. Because of rugged construction, "Minilab" pumps can be used around-the-clock.

Internal, self-lubricating Teflon bearings eliminate all problems of product contamination. In addition, the pump can be steam and chemically sterilized. Yielding a linear flow, ideal for constant-flow metering, the unit is reversible and may be staged for higher pressures.

Send for complete specifications and pump curves.

Hastelloy — trademark of Union Carbide Corp. Teflon — trademark of E. I. duPont

ECO

the big name in small pumps

ENGINEERING COMPANY

12 NEW YORK AVE., NEWARK 1, N.J.
MArket 4-6565

Check 3080 opposite last page.

Although chlorine dioxide affords many advantages in pulp bleaching, it also attacks most materials of construction. At West Virginia Pulp and Paper Co., polyester-based cement . . .

Resists ClO_2 attack, provides economical tower construction

Problem: Production of chlorine dioxide gas involves reaction of sulfur dioxide on sodium chlorate (46%) in presence of sulfuric acid (60 Bé). Chlorine dioxide is a highly corrosive oxidizing and bleaching agent. Combined with reacting materials, it presents an extremely corrosive medium capable of attacking most common materials of construction. Lead-lined reaction vessels have performed satisfactorily for actual ClO_2 production. However, absorption and use of gas for bleaching purposes at West Virginia Pulp and Paper Company, Covington, Va., required more economical construction for practical application to full-scale pulp mill operations, particularly in 17′-diameter, 69′-high bleaching towers.

Chlorine dioxide has the unique property of bleaching various materials, notably cellulose, with little, if any, degradation. Its use results in production of brighter pulp with greater strength and cleanliness. In addition, this

◀ Lining of 17'-diameter 69'-high bleach tower. Chemical-resistant brick is joined by polyester-based resin cement having low shrinkage factor which resists ClO^2

means increased use of hardwoods, bringing the industry into a better balance with ratio of wood species that grow naturally. In the process selected for producing ClO_2 at West Virginia Pulp and Paper, reaction is carried out continuously in a lead-lined reactor. Chlorine dioxide gas produced, is then absorbed in cold water in a counter-current, packed, absorption tower at a concentration of 6-12 gm/1. This solution is metered to pulp slurry in a sufficient quantity to maintain a concentration in slurry of approximately 0.5% of gas weight based on weight of air-dry pulp. Pulp-slurry mixture then passes to bleaching towers where it is retained for sufficient time to allow bleaching action to take place.

Solution: After careful consideration of available materials of construction, West Virginia Pulp and Paper Co., selected the following chemical-resistant construction for absorption tower and bleaching towers when ClO_2 process was installed in mid-1955. Steel tower shell was first lined with sheet linings of 3/32" plasticized polyvinyl chloride. Linings were protected from thermal attack and abrasion by one or two courses of a chemical-resistant brick. Masonry units were bonded with a specifically compounded formulation of polyester-resin based cement with minimum shrinkage. Cement was furnished as a two-component system; one containing liquid resin with suitable room-temperature accelerators, a second with selected reinforcing fillers and a catalyst for the resin. Two-and-one-half to three-and-one-half parts of powder component are mixed with one part of liquid to obtain a workable mortar. This mortar can be applied by appropriate modifications of bricklayer and tile setter techniques. Mortar has a usable working life of thirty to forty-five minutes and attains an early initial set with 90% of final physical strength. Fully cured cement has a tensile strength of 1700 to 2000 psi.

Results: Simplicity of design, relatively low initial investment, ease of operation with low maintenance, resulted in economical use of ClO_2 for pulp bleaching. Installation proved so successful that West Virginia Pulp and Paper erected a second bleaching plant at its Tyrone, Pa., location and now are installing new units at their Luke, Md., plant, using the same materials and contractor for the installation.

Properly compounded polyester resin-based cements are unaffected by corrosive action of either the chemicals used to generate chlorine dioxide or resulting ClO_2 solution.

(Plasticized polyvinyl chloride and polyester-based cement were supplied by Nukem Products Corp., Buffalo 20, New York.)

Check 3081 opposite last page.

(Tower linings installed by Chemsteel Construction Co., Inc., 5428 Walnut and Copeland St., Pittsburgh 32, Pa.)

Check 3082 opposite last page.

CARBOMASTIC

EPOXY TAR COATINGS

effective corrosion resistance at less than 1¢ per mil foot

Carbomastic Coatings Give You

- Higher solids content, averaging 88% by weight
- 10 mils thickness per coat
- Greater flexibility in temperature changes
- Black, brown or aluminum
- Can be coated over with Phenoline 305-2 for additional colors

USE CARBOLINE'S ENGINEERING APPROACH AND COMPARE THE FACTS: solids content, coverage per gallon, mil feet per gallon, mil thickness per coat, resistance to corrosive, estimated recoating cycles, COST PER SQUARE FOOT PER YEAR OF SERVICE.

CARBOMASTICS have many wide applications such as:

CHEMICAL PROCESSING . . . Tank linings and pipes carrying brine, process water, cooling water; also for maintenance and equipment.

MARINE . . . Offshore structures, tankers, barges, steel dock structures and equipment.

PETROLEUM . . . Salt water disposal lines and wells, crude oil storage tank bottom, pipe linings, crude oil flow lines, roof top exteriors.

PULP & PAPER . . . Structural steel, tank exteriors — all high-humidity and condensation conditions.

WRITE TODAY for Bulletin 803, technical data sheets and corrosion charts. Testing panels available upon request. Make your own comparison.

carboline COMPANY

32-B Hanley Industrial Ct.
St. Louis 17, Mo.

Manufacturers of PHENOLINE, POLYCLAD, RUSTBOND PRIMERS.

CARBOMASTIC

Check 3083 opposite last page.

SMOOTH DESIGN

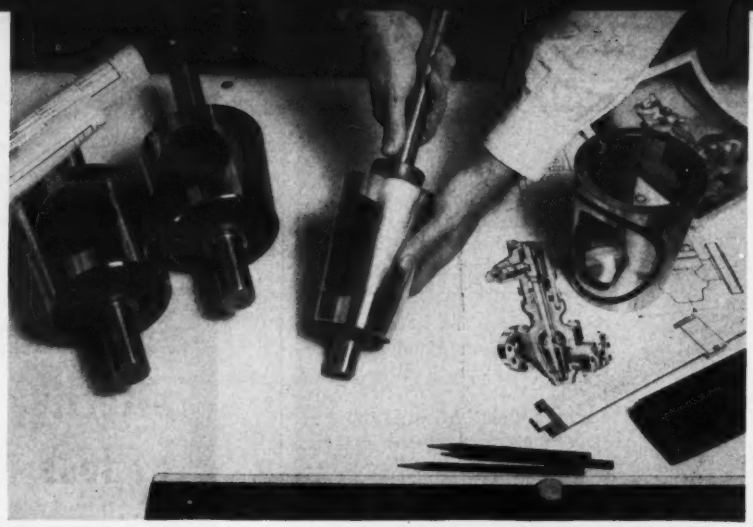
The sealing surfaces of Cameron Non-Lubricated Lift-Plug Valves are smooth—so smooth they require no greases, no expensive lubrication program to maintain a perfect seal. They close bubble-tight on today's elusive, high pressure fluids and gases.

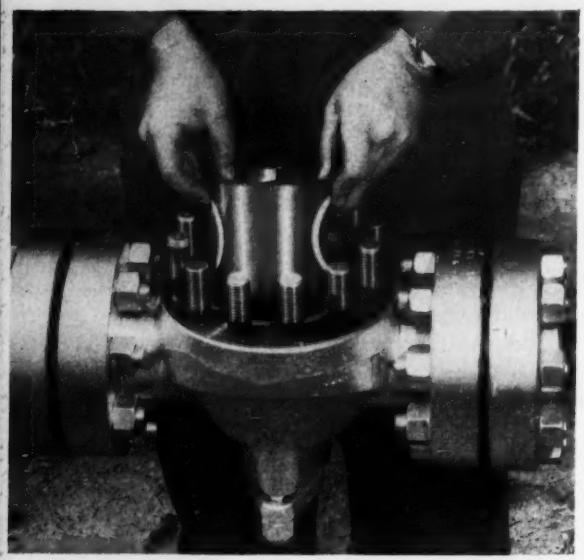
The unusual Cameron Lift-Plug design eliminates friction because the plug is lifted from the seat before rotating—actually never touches the seat except when completely open or closed. Unlike ordinary valves, Lift-Plugs employ a removable seat which is sealed off from the body and will not reflect pressure distortions. As an added benefit, this makes possible special trims for a wide range of services and temperatures — stainless steel for corrosives, Hycar for LPG, etc.

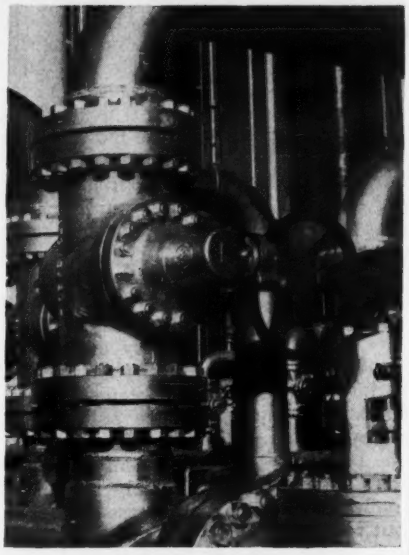
When repairs are finally necessary the seat and plug may be easily replaced without removing the valve from the line. Flanges and connection leaks can be eliminated by permanently welding Lift-Plugs into the line.

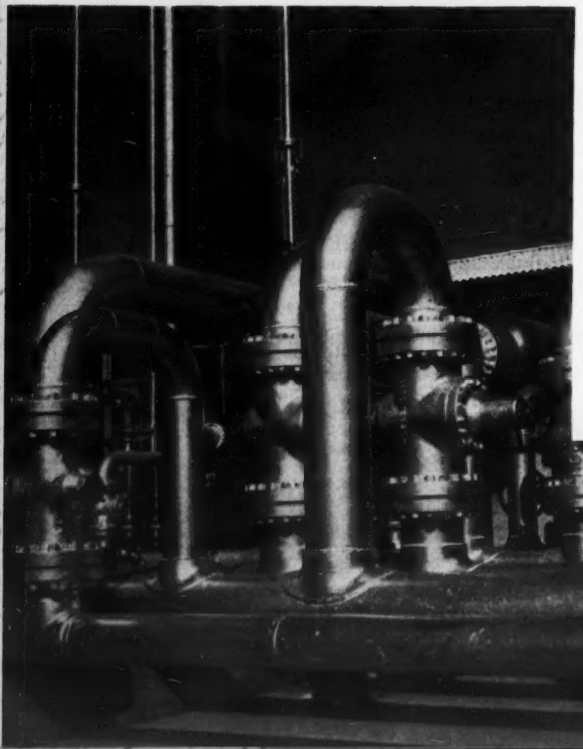
Last but not least, this smooth design requires far less operating torque. An easy moving cam lifts the plug from the seat, rotates it one-quarter turn and re-seats it in the opposite position. Oversize handles and cheaters are never found where Lift-Plugs are on the job.

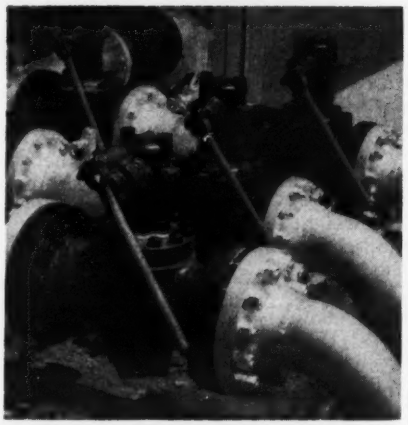
If you are not already enjoying these benefits, call on Cameron for maintenance-free valve operation.











Cameron

IRON WORKS, Inc.

P. O. Box 1212 — Houston, Texas

Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works, Ltd., Time & Life Bldg., New Bond Street, London W. 1 England

For more information on product at left, specify 3084 see information request blank opposite last page.

THAT'S INTERESTING

Nuclear sport

Golf balls after gamma ray exposure give longer driving distances and have tougher covers. Tests at B. F. Goodrich have shown that irradiated balls need less than two minutes exposure to gamma rays of high intensity to give greater distance and improve cut and scuff resistance, and give a better "click." Treated balls do not become radio-active, cannot be distinguished from an ordinary ball in any way. Treated balls are not in commercial production. They were produced as part of company's work in studying affect of gamma rays in vulcanization of rubber products.

Air safety

Should normal cabin pressurization fail in any of the new all-jet liners scheduled for operation in a year or so, an oxygen mask will be dropped down automatically to each passenger. (*Flying*)

Danger of spalling nixed in fast temperature flux with carbon packing

Uses: For operations involving hot alkalis, mixtures of hydrofluoric and sulfuric acids or hydrofluoric and phosphoric acids, and where chemical ceramics would prove unsuitable.

Features: Low co-efficient of thermal expansion enables saddles to be used under conditions of abrupt temperature change without danger of spalling.

Saddles of 100% carbon are new development in tower packings

Description: Lightweight, strong, saddle packing is made from 100% carbon. Saddles are presently available in 1″ size only.

(Carbon Intalox Saddle Packing is product of Process Equipment Div., The U.S. Stoneware Co., Akron 9, Ohio.)

Check 3085 opposite last page.

Corrosion effects

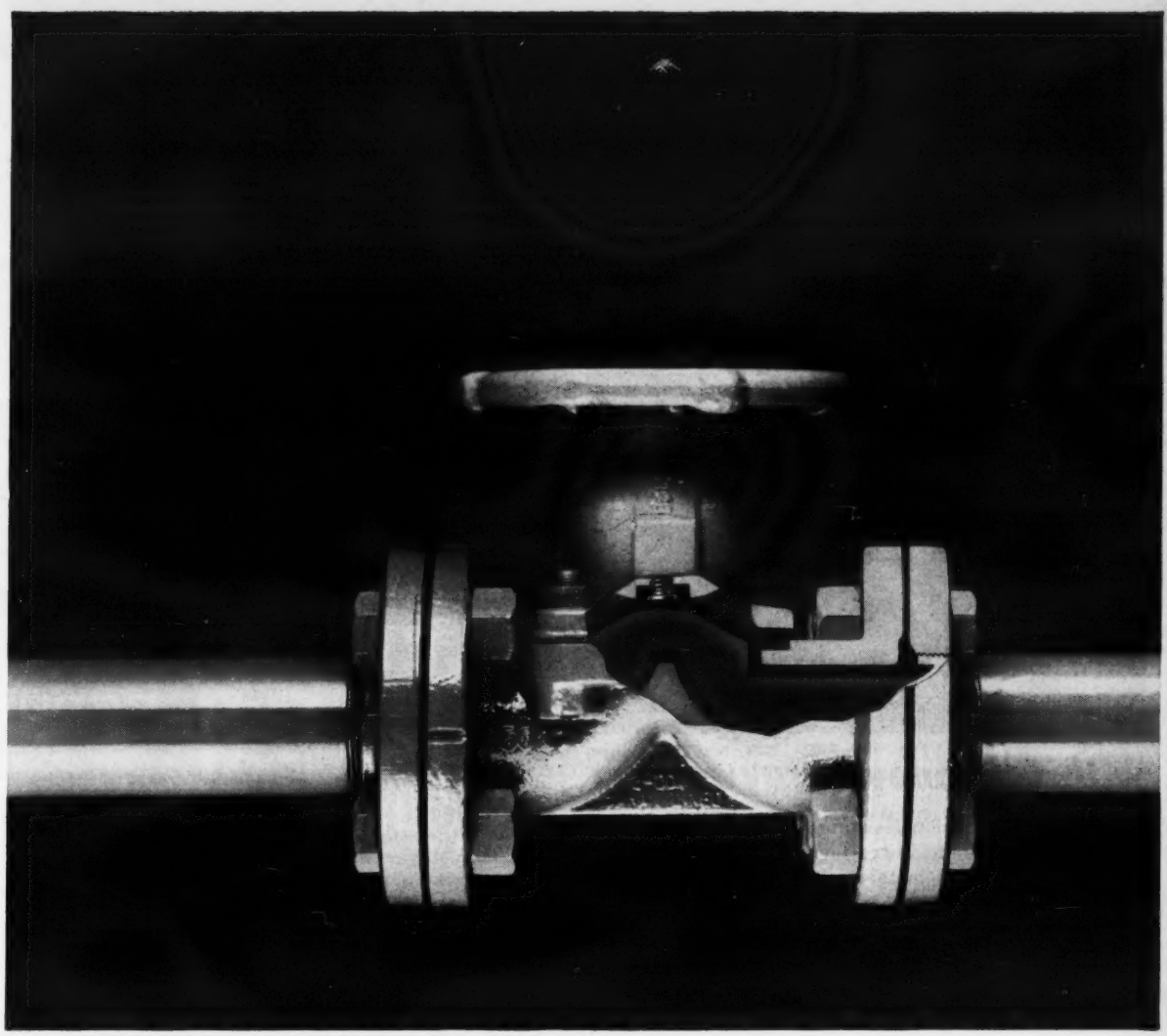
Atmospheric corrosion and corrosion by soils are discussed in separate data sheets. Data sheets 1-12.1.4 and 1-12.1.6 — Chemical Plants Div., Blaw-Knox Company, Pittsburgh 30, Pa.

Check 3086 opposite last page.

PVC Y-sediment strainer assures adequate flow in corrosive service

Uses: For service on alkalis, acids, inorganic salt solutions, and other corrosive materials.

Features: Open area of perforated screen is at least twice cross-sectional area of corre-



Corrosion protection is continuous in saran lined pipe—liquid never touches metal.

Here's why Saran lined pipe offers long range economy

It's rigid steel pipe . . . lined with corrosion-resistant saran . . . keeps shutdowns to a minimum for years

Looking ahead? Do your plans call for a complete corrosion-resistant piping system with a low total installation cost . . . a system that requires a minimum of maintenance . . . that's simple to modify . . . that can be fabricated in the field?

Then it will pay you in every way to look into the genuine economy of a complete system of saran lined pipe.

First, consider the natural advantages of the new gray saran lining itself. Its lower coefficient of thermal expansion and contraction more closely approaches that of steel. This provides a broader operating temperature range and greater resistance to thermal cycling. It can be installed in systems with operating pressures from full vacuum to 300 p.s.i. and temperatures up to 200° F. Add to these advantages the immediate availability of saran lined pipe, valves, pumps and fittings and you have an ideal piping system that can be installed without trouble, waiting or hidden costs.

If your plans call for lined tanks, you'll want the advantages of Saraloy® 898 tank lining added to your saran lined pipe system. Get the complete story on how it will pay you to install a complete saran and Saraloy 898 lined system. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. 2000-B
2415 BURDETT AVENUE
FERNDALE 20, MICHIGAN

Please send me information on:
☐ Saran lined pipe, fittings and valves.
☐ Saran lined centrifugal pumps.
☐ Saraloy 898 chemical-resistant sheeting.

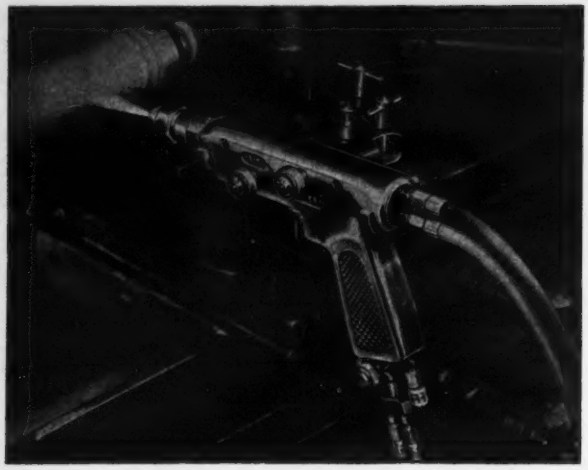
Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

Check 3087 opposite last page.

STOP CORROSION

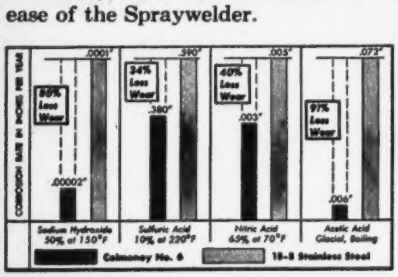


with Colmonoy Spraywelding

The superior corrosion resistance of Colmonoy No. 6 alloy makes it the ideal hard-facing material for use on surfaces undergoing metal-to-metal wear under corrosive conditions, such as pump and valve parts.

The Colmonoy Spraywelder puts No. 6 on fast, in powder form. It makes smooth overlays within .010" of desired size, requiring a minimum of finishing. Sprayweld overlays are solid and welded to the base metal.

The corrosion of vital process equipment parts becomes needless waste when the wear resistant qualities of Colmonoy No. 6 are combined with the economy and ease of the Spraywelder.



This table shows the comparative resistance to corrosion of Colmonoy No. 6 and 18-8 stainless steel. No. 6 is resistant to almost all caustics and acids. Ask for Engineering Data Sheet No. 3.

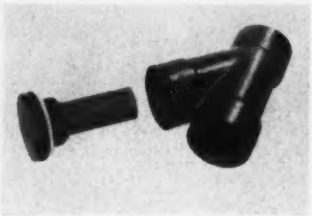
WRITE RIGHT NOW
For the Colmonoy Spraywelder Catalog and Hard-Facing Manual No. 79

HARD-FACING & BRAZING ALLOYS
WALL COLMONOY CORP.
19345 JOHN R STREET · DETROIT 3, MICHIGAN
BIRMINGHAM · BUFFALO · CHICAGO · HOUSTON · LOS ANGELES
MORRISVILLE, PA. · NEW YORK · PITTSBURGH · MONTREAL · GREAT BRITAIN

Check 3088 opposite last page.

sponding Schedule 80 pipe, thus assuring adequate flow. Lightweight strainer is easily handled and installed. Screen, which is welded to strainer cap, is merely unscrewed for cleaning.

Description: All-plastic Y-sediment strainer is made of



Lightweight, PVC strainer is easily handled and installed. Screen is merely unscrewed for cleaning

highly corrosion-resistant rigid polyvinyl chloride. Rigid PVC sheet contains 1/32"-holes. It has service rating of 150 psi at 75°F and 75 psi at 150°F.

Strainer is available with either threaded, solvent-weld, socket-type, or flanged ends, and comes in five sizes from ½ through 2".

(PVC Y-sediment strainer is product of Walworth Company, 60 East 42nd Street, New York 17, New York.)

Check 3089 opposite last page.

"Now tell us exactly HOW you got stuck in the condenser!"

Thanks to Ken Boyea of Hercules Powder Company, Holyoke, Mass.

ORDER YOUR FREE
Republic ELECTRUNITE
DATA CHARTS TODAY!

Get these attractive 18½" x 20½" charts free. Republic ELECTRUNITE® Welded Stainless Steel Tubing and Republic ELECTRUNITE Welded Carbon Steel Tubing facts, figures, tolerances, data. Order today!
Indicate: Carbon ☐ Stainless ☐

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Check 3090 opposite last page.

PUMP LIQUIDS GASES SLURRIES
WITHOUT CONTAMINATION OR CORROSION

Wavelike Motion of Steel Fingers Forces Material Through Tubing

Cap. 0.2 cc. per min. to 4.5 G.P.M.
Prices $60.00 to $550.00
depending on size and accessories

Write for Descriptive Literature

SIGMAMOTOR, INC.
18 North Main St. • Middleport, N.Y.

Check 3091 opposite last page.

THAT'S INTERESTING

Climate control

A 9.6 cubic foot piece of any climate in the world can be dialed at will with a new testing instrument now offered.

This unit is able to duplicate any global climatic condition from frigid arctic to sultry Sahara.

Controls are accurate to within plus or minus 1% relative humidity, plus or minus 1° F in temperature.

Unit can recreate any climatic condition up to 99% relative humidity and up to 160° F.

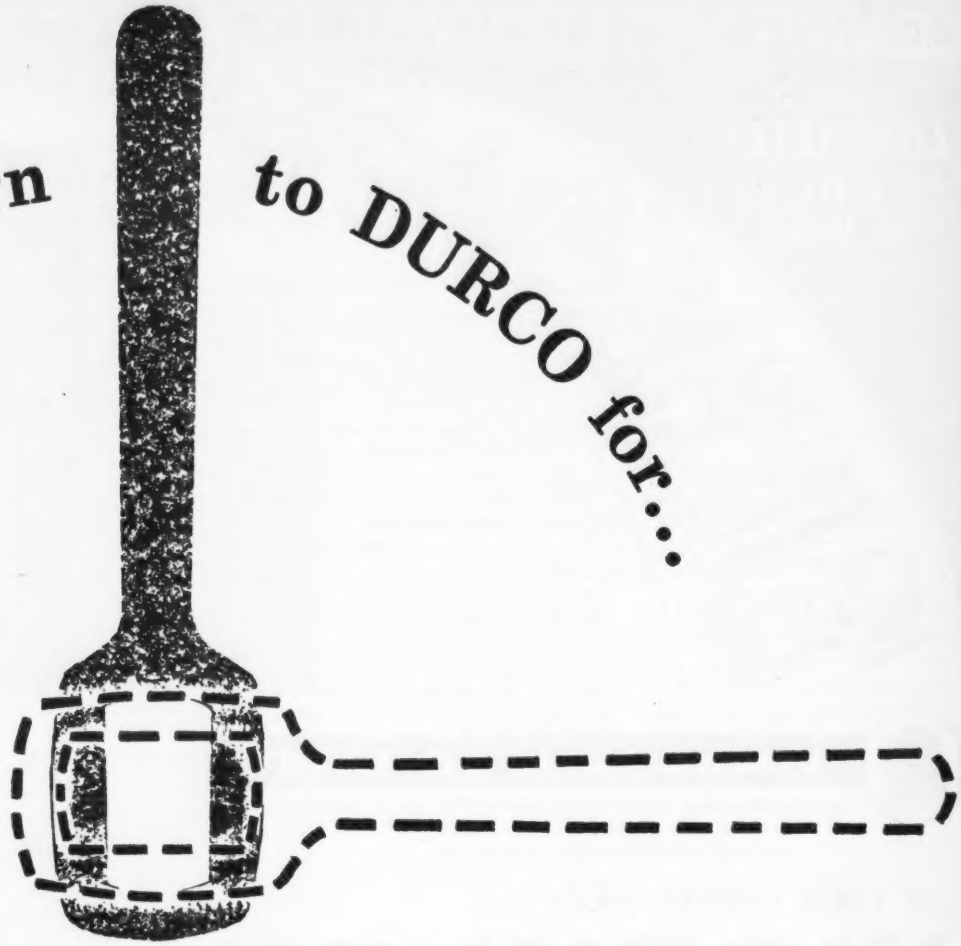
Control system records the time temp and humidty.

Precise performance

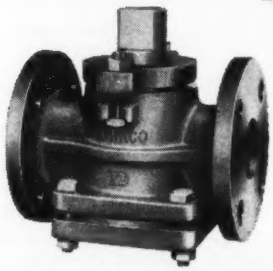
Instruments used for checking the mechanical and electronic systems in aircraft and missiles can measure width of a hair at a distance equal to length of a football field. (*Research Briefs*, AFOSR)

For more information on product at right, specify 3092 see information request blank opposite last page.

Turn to DURCO for...



Industry's best chemical service valves

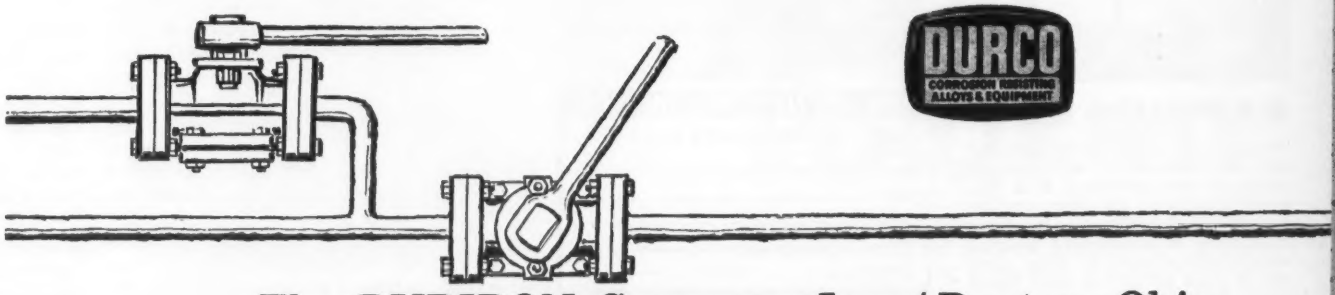


Durco Type F valves are available in 150# and 300# design, as well as three-way. Complete details in Durco Bulletin V/4b.

Durco Type F valves with Teflon sleeves have been proven in thousands of industry's toughest applications to be trouble-free, maintenance-free, and dependable.

Turn to the Durco Type F valve for non-sticking, non-lubricated, economical operation. For long life when handling severe corrosives, get Durco Type F valves. Available in a wide range of alloys in sizes to 3".

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT



The DURIRON Company, Inc. / Dayton, Ohio

Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, and Pittsburgh

ARE YOU BUYING ROTARY PUMPS...

...from a **COMPLETE* LINE** Like Viking?

You have many advantages when you buy from the COMPLETE line of Viking rotary pumps —quality controlled from beginning to end.

You can save money on original cost and performance. You can have the right size and capacity for your job. You can have the right power—not too little or too much. You can have a pump built for the work to be done. You can have fast self-priming and smooth, even flow of liquids or semi-solids.

* You can choose from over 750 catalogued models —or from hundreds of special arrangements—or have one built particularly for your needs. 2/3 to 1050 G.P.M. Write today for folder 585 CC

Viking The Leader — Not a Follower in Rotary Pumps

VIKING PUMP COMPANY

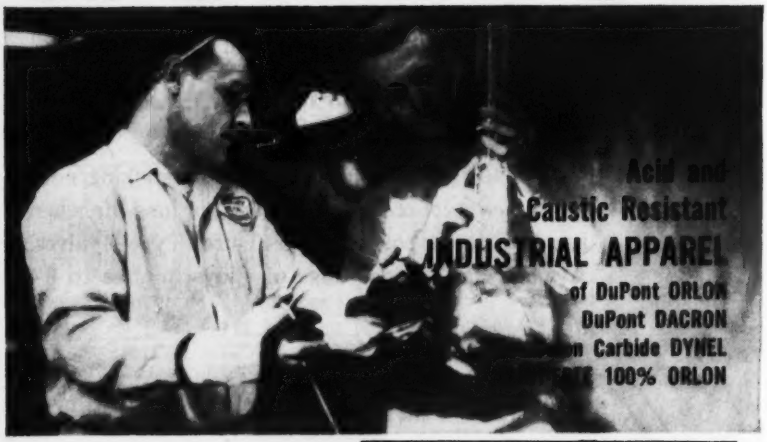
Cedar Falls, Iowa, U.S.A. In Canada, it's "*ROTO-KING*" pumps

See Our Catalog in Sweet's Plant Engineers File

Check 3093 opposite last page.

50 TIMES LONGER WEAR *with*

WORKLON



SAVINGS UP TO 93%

Worklon work clothes resist punishing acids and chemicals . . . actually outlast cotton and wool garments by **50 to 1** as proved in on-the-job tests under corrosive chemical conditions. No need for constant replacement of acid-damaged uniforms! Worklon apparel wears far longer, saves you as much as 93% in work clothes costs! Want proof? See Worklon's new 1958 catalog and information book. It's yours for the asking!

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Please send me the new Worklon Catalog FREE!

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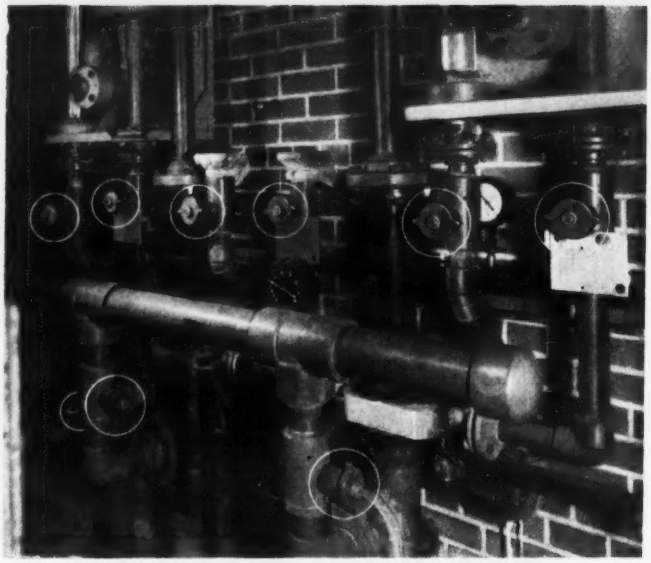
WORKLON

253 W. 28 St. N Y N Y

Check 3094 opposite last page.



Circles indicate PVC ball valves in service at utility

Corrosive chemicals haven't hurt PVC ball valves

Plastic units, which employ Teflon seats and seals, are giving good service at large utility

Recently developed PVC ball valves are being used successfully in the hypochlorination plant of a large utility in the East. Employed at a critical stage of the system, the plastic valves control the flow of sodium hypochlorite to an ejector for mixing with water from screen wash pumps. PVC valves have been in use in the corrosive service for more than six months and show no signs of needing replacement or maintenance.

Sodium hypochlorite used in system is stabilized with caustic, then added to cooler condenser water (mixed or diluted) to keep under control such fouling organisms as water slime, algae, and other marine growth. Application made it necessary to obtain valves that could resist the corrosive conditions.

PVC ball valves have stood up well in the application because of their 100% plastic construction. Seats and seals are Teflon. Double-seal valve action is another advantage. Simple quarter-turn operation, full pipe-line flow, and easy adaptability for remote and air-operated control are other features that make the plastic valves practical and economical in this application.

PVC valves used in the operation handle daily flows of sodium hypochlorites for a period of one-half hour during which time about 20 gpm is added to the condenser water. No lubrication is required in the operation of the valves.

(PVC valves are product of Jamesbury Corp., 45 New St., Worcester, Mass.)

Check 3095 opposite last page.

Corrosion meter

Illustrated folder of six pages contains information on operation, construction, advantages, and application of manufacturer's meter for measuring corrosion. Included in the folder are three technical bulletins containing data on various probes. Bul Cl-57, Crest Instrument Co., Santa Fe Springs, Calif.

Check 3096 opposite last page.

Hose liner chemically inert over wide range of temperatures

Provides excellent fatigue life and good flexibility

Uses: For preventing liquids or gases being conveyed through hose from coming into contact with metal portions of fitting.

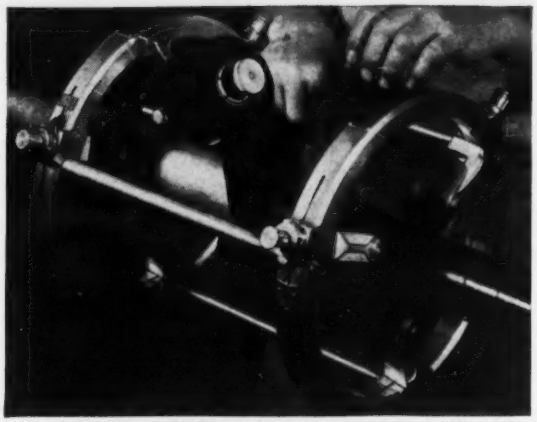
Features: Liner in hose assembly is chemically inert over extremely wide temperature range and provides excellent fatigue-life and flexibility.

Hose assembly liner of Teflon keeps corrosive fluids or gases from contacting metal portion of basic fitting

Description: T-flanged hose assembly is composed of a compound of Teflon. Assembly carries hose liner through fitting and across face of flange — keeps fluid or gases from contacting metal portions of basic fitting. Design eliminates the necessity of giving special consideration to chemical corrosion resistance of metal fittings.

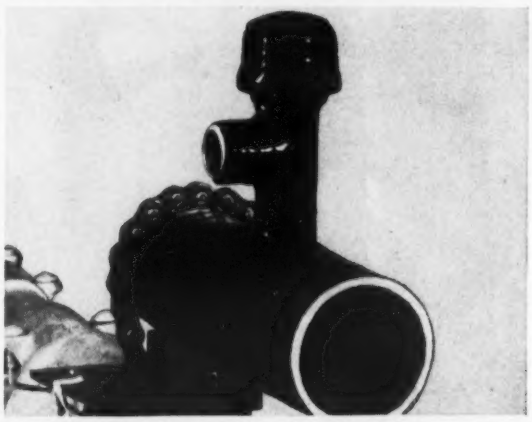
Assembly is available in

One of these three is the tape coating for you



Polyken No. 900—12 mils, the original all-inclusive tape coating for straight-run applications.

Polyken No. 920—20 mils, thick and tough for heavy-duty use on straight runs, yet it's conformable, too.



Polyken No. 940—12 mils, just the right balance between elasticity and super-conformability for use on irregular pipe structures.

Only if you use a *Polyken* polyethylene tape on *accessory* jobs are you getting the most for your money

Whatever your need in accessory tape coatings, you will find a *better* solution at *lower* cost with one of these Polyken tapes.

Top corrosion fighter

Why Polyken? Because only Polyken has successfully developed the complete line of polyethylene tape coatings. And no other tape coating—*absolutely none*—can match the remarkable properties of Polyken polyethylene:

- **tough and elastic**
- **unplasticized, non-drying film**
- **doubly thick adhesive to seal all voids**
- **far higher adhesion for a true bond to pipe surface**
- **lower water vapor transmission rate**
- **higher electrical insulation resistance**
- **better cold weather handling and durability**

Compare the cost of each Polyken tape with that of the competitive tape it surpasses. See for yourself on your next purchase order.

Here is your Polyken Distributor . . . Contact him now.

Atlanta, Georgia: Anti-Corrosion Mfg. Co., Inc.
Chicago, Ill.: Sales Engineering, Inc.
Cincinnati, Ohio: Hare Equipment
Cleveland, Ohio: The Harco Corp.
Des Moines, Ia.: The Donald Corp.
Fort Worth, Texas: Plastic Engineering & Sales Corp.
Harvey, La.: Allen Cathodic Protection Co.
Kansas City, Mo.: Industrial Coating's Engineering Co.
Long Beach, Calif.: Barnes & Delaney
Minneapolis, Minn.: Simcoe Equipment Co.
Oakland, Calif.: Bison Co.
Philadelphia, Pa.: Harold N. Davis Co.
Pittsburgh, Pa.: Royston Laboratories, Inc.
Plainfield, New Jersey: Stuart Steel Protection Corp.
St. Louis, Mo.: Shutt Process Equipment Corp.
San Francisco, Calif.: Aetna Sales Co.
Seattle, Wash.: Farwest Corrosion Control Corp.
Seattle, Wash.: Pacific Water Works Supply Co.
Tulsa, Okla.: William Cluff Corp.

Complete catalog, Sweet's Industrial Construction File, Sec. 31/Ke

Polyken®

PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division

Check 3097 opposite last page.

wide size range with hose having an inside diameter from ⅝ to 1⅜". Flanged coupling section is provided in modified ASA 150# forged steel flanges ranging in size from ½ to 2". All sizes are available in standard 10-ft assemblies or smaller, and it is expected that longer assembly lengths will be available soon.

(Fluoroflex-T flanged hose assembly is product of Resistoflex Corp., Roseland, N.J.)

Check 3098 opposite last page.

Aluminum jacketing shields steam pipe from corrosion

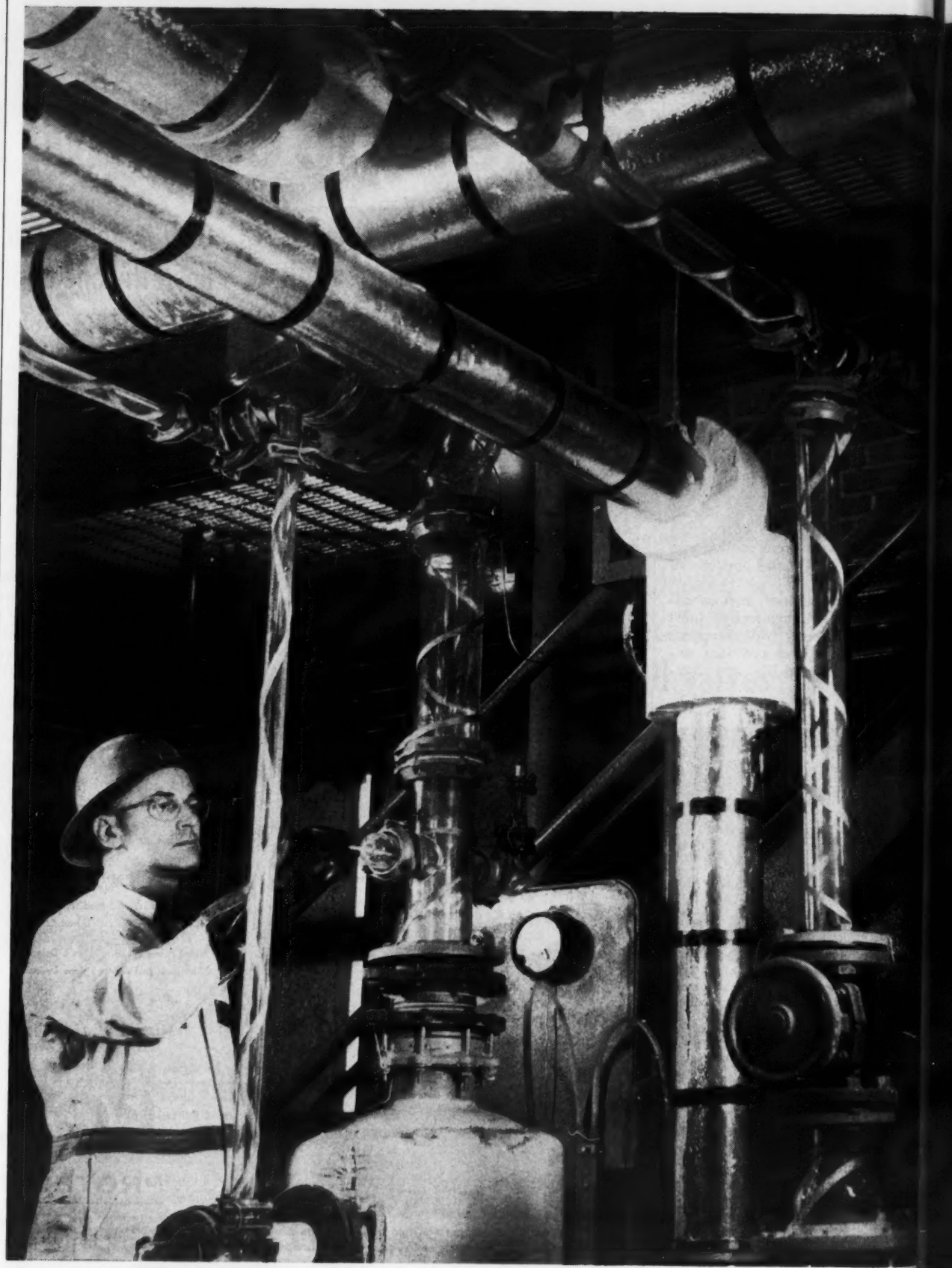
Protects 5½ miles of large, insulated steel pipe

One of the largest aluminum applications of this type protects steam-carrying pipe line system from damaging weather and corrosive industrial-marine atmosphere. Applying 80,000 lb of alloy 3003 aluminum sheet, pipe jacketing shields 5½ miles of large-diameter, insulated steel pipe.

Corrosion-resistant aluminum jacketing protects steam-carrying pipe line system from damaging weather and corrosive atmosphere

Aluminum sheet was cut to size, shaped, and punched prior to reaching job site. When installed, easily handled sections were drawn tightly around felt-covered insulations, and secured with self-tapping screws. Complete weather proofing was insured by careful overlapping of adjacent sheets.

Steam-carrying pipe line system links Esso Standard Oil Company's Bayway refinery with Linden, N. J., generating station of Public Service Electric and Gas Company. Nearly



Between this man and a highly volatile chemical lie only PYREX® Pipe and confidence

At this ether distillation operation in a Baker & Adamson plant precaution is the password; you can see it in the hat, the gloves, the static ground wrappings on the pipe . . . *and the pipe itself.*

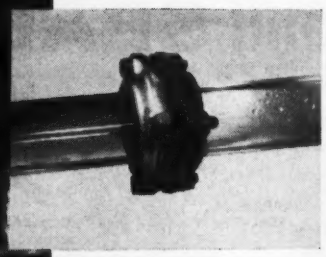
The pipe is strong. You can't take chances with pure ether. "Double-Tough" PYREX Pipe is made to take pressure and heat and a goodly amount of mechanical abuse.

The pipe cannot corrode. Not from ether or from any other chemical but hydrofluoric acid and hot alkalies.

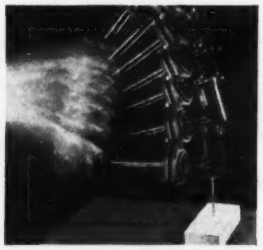
The pipe cannot contaminate. It's completely inert—vital when you're making an A.C.S. Reagent Grade chemical.

And the pipe is transparent. You can see what's going on inside PYREX Pipe. Maintenance men can judge its condition at all times just by looking. Should a blocking occur they can spot it exactly and ascertain its nature *without* opening the pipe.

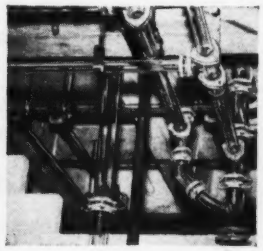
Such features should certainly induce you to learn more about this remarkable pipe by writing for Bulletin PE-3.



It's easy to install: Any plumber can install this drainline. One contractor proved he could make connections with PYREX drainline 16 times faster than bell and spigot connections. All fittings are standard.



It's hammer-strong: You can actually hammer nails through a block of wood with PYREX drainline. A new heat-strengthening process makes pipes and fittings 2½ to 3 times as strong as ordinary glass.



It's easy to clean. Even the stickiest chemicals find it hard to cling to the glass from which PYREX Pipe is made. Should they stick, a simple acid or steam flushing removes them quickly.

Same glass for drainlines: You can set up complete drainlines with this same PYREX Pipe. All components—from cup sinks to traps to outlets are readily available.

◀ *Raw ether runs through these PYREX Pipes at a Baker & Adamson plant without a trace of corrosion or product contamination.*

CORNING GLASS WORKS, 31 Crystal Street, Corning, New York

Corning means research in Glass

Check 3099 opposite last page.

all steam required in refinery processing operations is now supplied by station through two 30" low-pressure lines and one high-pressure 20" line.

(Aluminum pipe jacketing is product of Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.)

Check 3100 opposite last page.

Valves resist corrosion

Bulletin of 10 pages covers construction, operation, and specifications of manufacturer's pinch valves which are resistant to abrasion and corrosion. Pinch valve bul — The Mine and Smelter Supply Co., Denver, Colorado.

Check 3101 opposite last page.

Teflon-lined pipe, fittings for pressures to 400 psi and from −90 to 400°F

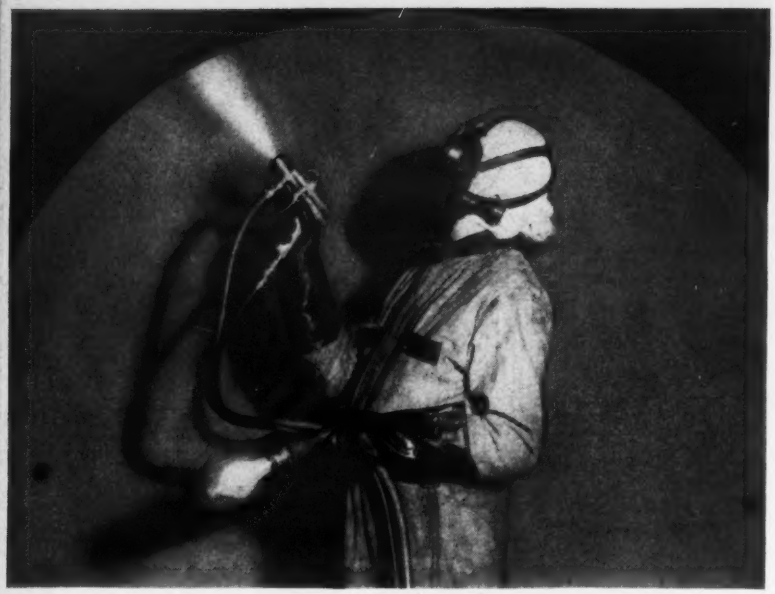
Flat mating surfaces eliminate added gasket flange

Uses: For handling corrosive acids and alkalis, foodstuffs, or other products where transfer of undesirable odors, flavors, or substances from pipe presents a problem.

Teflon lining, extended over entire raised-face area of flanges, makes perfectly flat and smooth mating surfaces for leakproof connections

Features: Lining material will withstand pressures up to 400 psi and temperatures ranging from −90 to 400°F. Lining is extended over entire raised area of flanges to make perfectly flat and smooth mating

To page 143



LITHCOTE PROTECTS AND OUTLASTS

HERE'S HOW LITHCOTE SOLVES CORROSION AND CONTAMINATION PROBLEMS... AT LESS COST!

This happens to be a railroad tank car . . . being Lithcote lined for the safe transportation of formaldehyde. Your corrosion or contamination problem, however, may not involve such large equipment. But whatever the size or shape, Lithcote can provide the lasting protection you want . . . and do it faster with resulting savings for you. We have been doing it some 22 years now.

Our service is not limited to the application of Lithcote linings. We have the experience and the equipment for applying the many name-brands you want, including AMERCOAT, BISONITE, COLUMBIA #7, COPON, PLASITE, UNICHROME, KEL-F. Tell us your requirements!

NEW FACILITIES...

Conveniently located on the outskirts of Chicago at Melrose Park. Fully equipped for custom coating and lining all shapes and sizes of equipment.

NEW CATALOG...

For more than a "product" bulletin. Lists actual applications in industry of all kinds. Gives complete data on famous *Lithcote* line.

LITHCOTE CORPORATION
5000 W. Lake St., Melrose Park, Ill. • 42 Belden Ave., Norwalk, Conn.
36 W. 44th St., New York 36, N. Y.

Check 3102 opposite last page.

SERVING INDUSTRY FOR 76 YEARS

Send Specifications for an estimate. Department 27

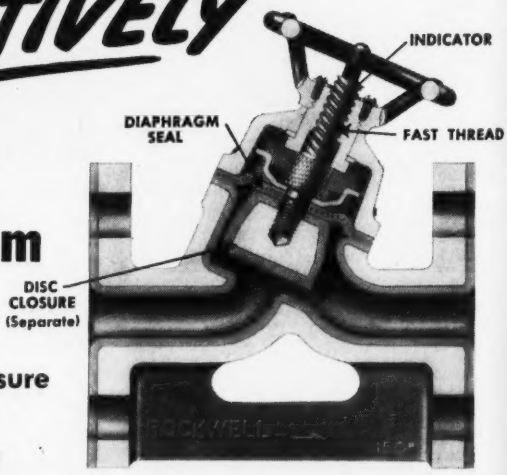
WIRE PRODUCTS Jelliff SINCE 1880

THE C. O. JELLIFF MANUFACTURING CORP.
SOUTHPORT • CONNECTICUT • USA

Check 3103 opposite last page.

CLOSES and SEALS POSITIVELY

"D-D" Diaphragm Valve



Disc for Positive Closure Diaphragm for Positive Sealing

- No packing gland to leak. Mechanism not exposed.
- Oversized ports; high capacity; low pressure drop. Largest capacity of any diaphragm type valve.
- Self-draining in horizontal position.
- Lower handwheel torque and fewer turns to close.
- Automatic control available.
- Body of any metal or with any lining. Sizes ½" to 6". Write for Bulletin 800.

W. S. ROCKWELL COMPANY
2208 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

Check 3104 opposite last page.

From page 141

surfaces for leakproof connections. This eliminates need for any additional gasket flange.

Description: Teflon-lined pipe, ells, and tees are available in 1 through 6″ inside-diameter sizes, and have flanged-end connections. Pipe is offered in 10′ lengths. Teflon lining in tees is solid and weldless. Ells are available in long radius.

Teflon-lined pipe, ells, and tees are available from John L. Doré Company, 5406 Schuler St., Houston, Texas.)

Check 3105 opposite last page.

Catalog stainless steel

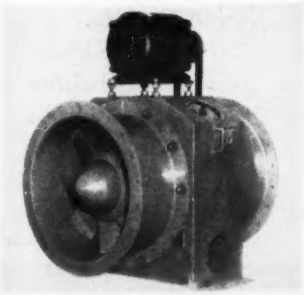
Illustrated 32-page catalog offers description, chemical composition, strength factors, physical properties, and typical applications for broad range of stainless types including 200, 300, and 400 series. Stainless steel cat — Sharon Steel Corporation, Sharon, Pa.

Check 3106 opposite last page.

PVC tubeaxial fan stops shut-downs, cuts costs

Uses: Exhausting corrosives.

Features: PVC units eliminate costly production shutdowns and high maintenance



PVC tubeaxial fan for industrial corrosion exhaust systems cuts costs

costs in plating, etching, pickling, and anodizing operations.

Description: Polyvinyl chloride tubeaxial fan has semi-

Corrosioneering News

Quick facts about the services and equipment available to help you reduce corrosion and processing costs.

Published by The Pfaudler Co., Rochester, N.Y., U.S.A.

Emergency at Gamma Chemical met by 3-day delivery of 500-gallon reactor

When extra processing capacity was urgently needed recently at Gamma's Great Meadows plant in New Jersey to custom process a new organic chemical, Gamma called Pfaudler and asked how fast a 500-gallon reactor could be shipped.

"How about the day after tomorrow," countered Pfaudler. "Sold!" said Gamma. Waiving the normal ten-day delivery schedule, Pfaudler rushed a standard unit through the shop even before the customer's written order arrived. The emergency was met—a 500-gallon glassed steel reactor was shipped—in just *three days' time!*

Gamma Chemical's plight points up one of the ways you can benefit from Pfaudler's policy of stocking standard glassed steel reactors. Fast delivery is only one of the savings, however. You can also cut initial costs by eliminating special engineering drawings, special parts, and material custom-designed units require.

You get a versatile, corrosion-resistant reactor whenever you specify a standard Pfaudler glassed steel vessel—resistant to all acids (except HF) and alkaline solutions up to pH 12 at 212° F. Each reactor is completely assembled and ready to ship within two weeks from receipt of your order.

READY TO GO. A standard 500-gallon reactor is readied for quick shipment to Gamma Chemical. This vessel was on its way to Gamma's Great Meadows plant even before a written order had arrived!

Take advantage of Gamma Chemical's experience and check with Pfaudler before you buy your next reactor. Contact your Pfaudler representative for more information on standard reactors. Units stocked for ten-day delivery include the following capacities: 30, 50, 100, 200, 300, 500, 750, 1000 and 2000 gallons. Check the coupon for sizes in which you are interested.

Rotary seal, stuffing box interchangeable on Pfaudler reactors*

The question of when to use a mechanical rotary seal *versus* a stuffing box can resolve itself simply to this:

For a wide range of operating conditions with minimum maintenance —the use of a seal is recommended.

In most normal service of low temperature and pressure, the stuffing box is initially more economical. However, as the service becomes more severe, the rotary seal is superior to the stuffing box on all four of the following points:

1. Chemical conditions. The seal performs better in processes which require freedom from lubricant contamination, from vapor loss, and from contact with metal.

2. Pressure. When pressure ranges from 100 to 300 psi, the seal is normally required. (Special designs are rated up to 1500 psi.)

3. Temperature. Stuffing boxes tend to leak considerably above 350° F. By running coolant through the housing of a rotary seal, you can operate at temperatures tolerable in Pfaudler reactors.

4. Agitator speed. Although this is less critical than other conditions, the seal is usually recommended when agitator speeds exceed 150 rpm.

To give you flexibility of operation, Pfaudler agitators are designed to use *either* seal *or* stuffing box on the *same* shaft. The shaft sleeve (upper right in photo—left) is the interchangeable element. With a Hastelloy sleeve you use a stuffing box. Simply replace it with a "glassed" sleeve and you are ready for a seal. On 3″ diameter agitator shafts and larger, you can make the changeover in your plant.

If you would like to study this question more thoroughly, there's considerable factual information in our Bulletin No. 938. Check coupon for copy.

*When specified at time of purchase

Now available 1958 BUYER'S GUIDE

Bulletin 947 is a capsule of Pfaudler equipment and services.

Are you aware of the wide range of materials of construction available to you in Pfaudler equipment? Glassed steel, clad and stainless steels, certainly—but do you know the list also includes Hastelloy, nickel, Inconel, titanium, copper and zirconium among others?

Pfaudler reactors, columns and heat exchangers are commonplace, but we also make such equipment as wiped-film evaporators, desludging centrifuges, vacuum dryer-blenders, and piston fillers.

The services, products, and technical aids supplied by Pfaudler—and we add to the list every year—are covered in Bulletin 947.

THE PFAUDLER CO.
Dept. CP-18, Rochester 3, N.Y.

Please send me information on standard reactors (check size) ☐ 30, ☐ 50, ☐ 100, ☐ 200, ☐ 300, ☐ 500, ☐ 750, ☐ 1000, ☐ 2000; ☐ Rotary seals and stuffing boxes, Bulletin 938; ☐ Buyer's Guide, Bulletin 947.

Name.....

Title.....

Company.....

Address.....

City ..... Zone ..... State .....

Check 3107 opposite last page.

pressure wheel and air-foil blades. A sealed, inner housing of PVC welded construction protects belts and pulleys from corrosive air. Fan has Teflon packing gland with stainless steel drive shaft. It is said to give outstanding performance while operating in any position.

(PVC tubeaxial fan is product of Industrial Plastics Fabricators, Inc., Endicott St., Norwood, Mass.)

Check 3108 opposite last page.

PVC-pipe bulletin

Pipe, sheets, rods, and fabricated parts of polyvinyl chloride plastic are in 12-page bulletin. Advantages, physical properties, and applications are included. Bul 80-3—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Illinois.

Check 3109 opposite last page.

Double PVC lining prevents corrosion of chlorine towers

Warping and cracking are eliminated

Uses: For chlorine cooling tower covers, connecting ductwork, transition adaptors, or services involving organic materials which normally leach plasticizers or embrittle linings.

Features: By varying thickness of plasticized ply, it is possible to allow for thermal expansion of rigid ply so that warping and cracking do not result from temp cycling.

Description: Lining consists of rigid polyvinyl chloride sheet applied over plasticized polyvinyl chloride sheet which is bonded to steel. Thickness of either ply can be varied from 1/16 to 3/16". Special bonding adhesives permit operating temperatures as high as 190°F without other thermal protection.

(Duply Sealon is product of Maurice A. Knight Company, Dept. CP, PO Box 111, Akron 9, Ohio.)

Check 3110 opposite last page.

Lighter! Tighter!

LUNCOR PVC VALVES

Defy Corrosion!

FIG. 2601
SOCKET END
125 WP—140° F.

FIG. 2600
SCREWED END
125 WP—140° F.

Replace expensive high-alloy or glass-lined valves in your corrosive services with these money-saving, high-performance valves. Luncor is the first all-molded PVC valve designed and engineered by a valve manufacturer . . . and its low-cost performance is proved in handling most common corrosive solutions. Luncor Valves weigh only half as much as aluminum—one-sixth as much as bronze. Yet their high strength-weight ratio gives them rigidity comparable to metal. Luncor Valves are available in one-half inch through two inch sizes.

To list only a few . . . Luncor PVC Valves have established outstanding records for economy and service in the following operations:

- PAPER MILLS
- CHEMICAL PLANTS
- FOOD PROCESSING
- BEVERAGE BOTTLING
- PETROLEUM REFINING
- SUGAR REFINING
- WATER TREATMENT
- MARINE INSTALLATIONS

For detailed service recommendations . . . request a *Confidential Corrosion Service Information Form* from your Lunkenheimer Distributor, or from The Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.

BRONZE • IRON • STEEL • PVC

L-857-9

LUNKENHEIMER QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

Check 3111 opposite last page.

Photos By CP Staff

Crawler-mounted tractor-shovel handles heavy-duty job of processing bulk shipments of pitch. Unit is small enough to maneuver in and out of cooling pans for breaking up solidified material

Each bucket-load holds close to four tons of material. Machine comes as complete unit — bucket assembly is not an attachment

Maintenance costs were mounting on bulk pitch handling operations at Koppers' Tar Products Div., Chicago — broken axles and wheels resulted from this heavy-duty operation. Company finds that a crawler-mounted tractor-shovel . . .

CUTS COSTS ON BULK PITCH LOADING

GEORGE V. MICHAEL, Assistant Editor
With **W. M. THORNS,** General Foreman
Tar Products Div., Koppers Co.
Chicago, Ill.

PROBLEM: Broken wheels and axles were accounting for untold maintenance costs on a unit purchased by Koppers Tar Products Div., in Chicago, to handle solid pitch when making bulk shipments.

Pitch from fractionating towers is drained into large open pans where it solidifies. A vehicle is needed to break up the pitch, scoop it up, and carry it to a conveyor for loading into box and hopper cars. It is this part of the operation that called for heavy-duty equipment which would be too large to maneuver in and out of the pans. Pans are out-of-doors, and are protected by sheds.

Turnover must be kept high — anything that would hamper unloading of pans would cause over-accumulation of material. This could have a direct effect on stills' production.

Solution: Two years ago, the plant purchased a crawler-mounted tractor-shovel to handle the loading operation. Machine is designed as a complete unit — bucket assembly is not a tractor attachment.

Model has a 70 hp, four-cylinder, four-cycle diesel engine. There are four speeds forward and two reverse. Maximum forward speed is 6.9 miles per hour.

The 1½-cu ft bucket is hydraulically operated. An almost unlimited range of working positions can be obtained with the lift and bucket control-arm design. Up to 40° of bucket tip-back is obtained at ground level, enabling operator to load and carry full bucket-load without raising it high in the air or declutching. A bucket-load averages 2 to 4 tons of solid pitch.

After the tractor breaks up the solidified pitch, it scoops up the material and dumps it into a hopper. Conveyor feeds material from hopper into railcars.

Other little jobs are also done by the tractor. It is used to jockey the railcars in and out of loading position. Also the operator uses the bucket to lift and move the hopper-conveyor unit.

A cab has been added to the unit for operator's comfort in all kinds of weather.

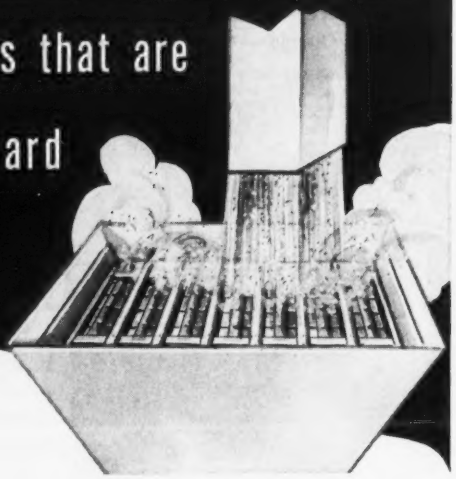
Results: In the two years that the tractor has been on the job, maintenance costs have been held to a minimum. Major item to date has been replacement of teeth on the bucket.

Unit is of a convenient size for proper maneuvering in and out of the pans.

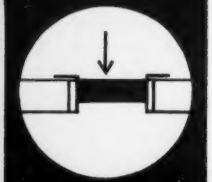
To page 147

DINGS GRATE MAGNETS

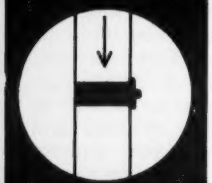
for positive, low-cost magnetic protection in trouble spots that are difficult to guard



Under, over or in steep-sloped hoppers



Mounted in floor openings



Drawer-type for vertical ducts

At discharge end of conveyors or spouts

Dings Permanent Alnico Grate Magnets assure positive protection from tramp iron damage in trouble spots which never before could be effectively guarded. They are the only units of this type designed with unshielded magnets which contact the material directly to provide powerful attraction for fine particles of fuzz iron as well as larger pieces of tramp iron. Recommended for powders and granular materials. Both wing and drawer types available in sizes and shapes for every need.

DINGS MAGNETIC SEPARATOR CO.
4731 W. Electric Ave.
Milwaukee 46, Wis.

Dings

DINGS MAGNETIC SEPARATOR CO.
4731 W. Electric Ave., Milwaukee 46, Wis.

Please rush Bulletin 1213A and further details about Dings Grate Magnets.

Name_____

Company_____

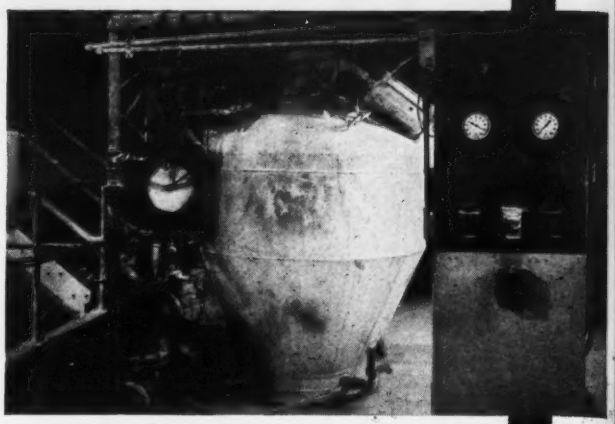
Address_____

City_____ Zone____ State_____

G-158⅔

Check 3112 opposite last page.

Difficult Bulk Handling Job



...but well-handled by the Robinson Air-Activated Conveyor

Product ... abrasive chemical, ¼" to fine dust
Temperature ... 600° F.

This Robinson Air-Activated Conveyor is installed in the plant of a well-known chemical company where it is conveying the hot chemical noted above ... a job on which other means of handling, including pneumatic, either failed or proved inadequate.

Robinson operations can be made fully automatic and closely controlled by precise instrumentation.

The Robinson System—completely pneumatic, with gravity feed—offers several outstanding advantages for handling fine granular or dry powdered materials into, through and from the plant.

1 ... products are handled gently; the mixture is 'fluidized'; particles are floated rather than blasted through the conveyor.

2 ... only low volume of air is required; the average is less than 1 cubic foot of free air per pound of material conveyed.

3 ... maintenance costs are exceptionally low; no moving parts such as motors, screws, shafts and bearings to require maintenance.

The Robinson Air-Activated Conveyor may be just what you need for pneumatically handling the materials at your plant. Investigate its possibilities. We can point to many successful installations. Write us in detail about your problem.

ROBINSON Air-Activated **CONVEYOR SYSTEMS**

A Division of Morse Boulger Destructor Co.

DEPARTMENT T, 80 FIFTH AVENUE • NEW YORK 11, N. Y.
Representatives in Principal Cities

Check 3113 opposite last page.

Bulk Pitch Loading

From page 145

Tractor handles other jobs such as spotting railroad cars and positioning loading conveyor (shown above)

In general, Koppers has been able to cut operating costs and at the same time obtain improvements in handling bulk shipments of pitch.

(Model 955 Traxcavator tractor-shovel is manufactured by Caterpillar Tractor Co., Peoria, Ill.)

Check 3114 opposite last page.

Continuous conveyor oven is designed to meet automation demands

Uses: For drying and baking processes, dehydrating, and baking-on finishes.

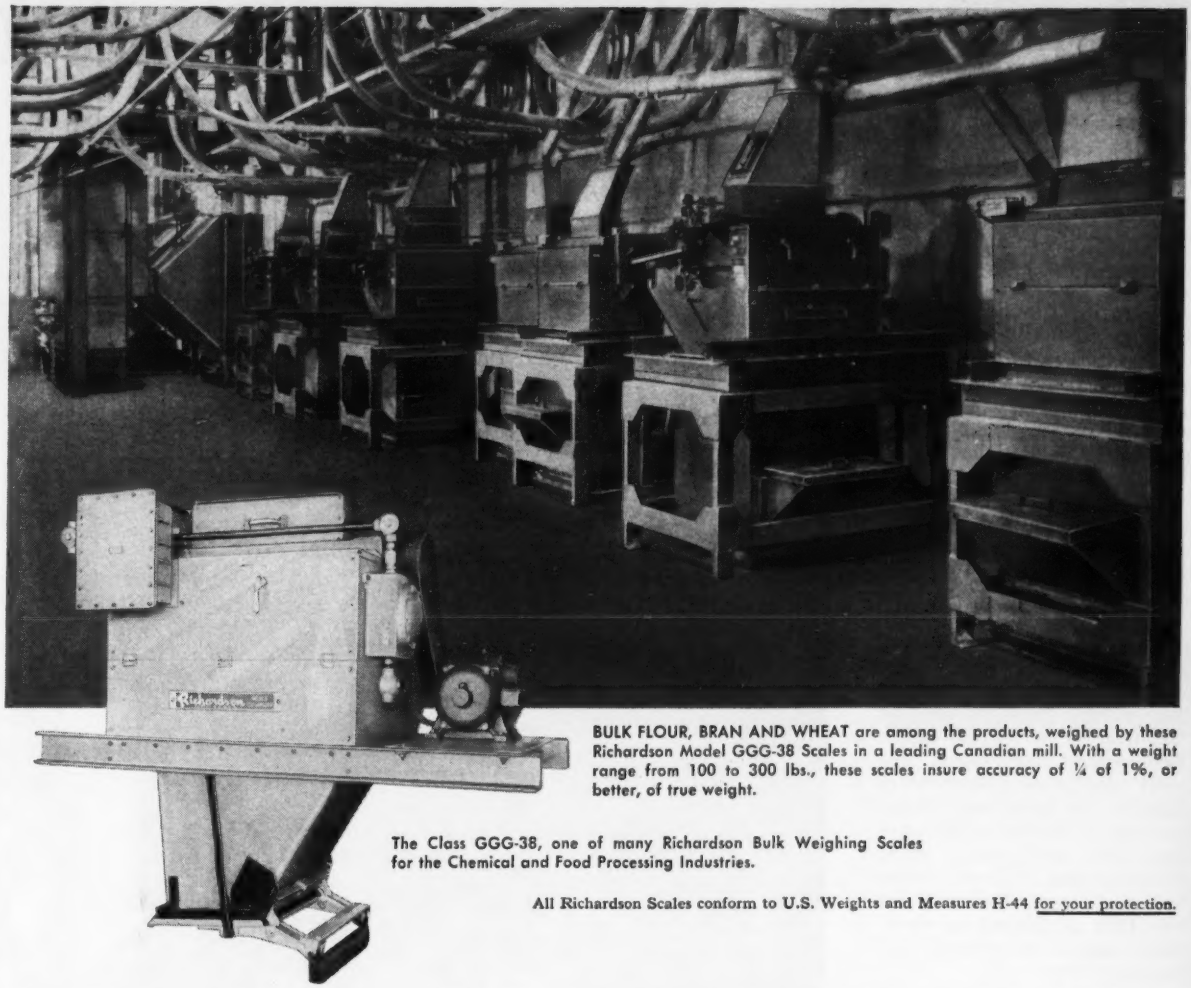
Features: Conveyor belt carries product through heated zone of oven and can be arranged for automatic loading and unloading facilities.

Description: Continuous belt of conveyor oven is 36″ wide, and is driven by an electric motor. Speed of belt is adjustable from 2 to 10′ per minute. Belt is 30″ high from floor. Extension of 6′ on each end is for loading and unloading products.

Inside dimensions of baking chamber of oven are 38″ wide, 24″ high, and 15′ long. Overall height of unit is 11′6″. Oven is equipped with counter balanced doors at each end, adjustable for desired opening. Ovens are available for heating by gas, electric, or steam.

(Continuous belt conveyor oven is product of Grieve-Hendry Company, Inc., 1401 W. Carroll Ave., Chicago 7, Illinois.)

Check 3115 opposite last page.



BULK FLOUR, BRAN AND WHEAT are among the products, weighed by these Richardson Model GGG-38 Scales in a leading Canadian mill. With a weight range from 100 to 300 lbs., these scales insure accuracy of ¼ of 1%, or better, of true weight.

The Class GGG-38, one of many Richardson Bulk Weighing Scales for the Chemical and Food Processing Industries.

All Richardson Scales conform to U.S. Weights and Measures H-44 for your protection.

Want to slice costs in weighing bulk materials?

Let Richardson Do It For You

Today's automated bulk materials handling systems demand scales that can give accurate, trouble-free service on the widest possible range of materials. That's why Richardson scales are used the world over—by chemical plants, food processors, feed and flour mills.
In unit weighing, process weighing or proportioning operations, you get:

- **REDUCED PRODUCTION COSTS** . . . weighing speeds suit any operation, pace production at economical level.
- **LONG-TERM RELIABILITY** . . . year-after-year rugged, accurate service.
- **SAVINGS IN TIME** . . . equipment stays "on stream," requires minimum maintenance or adjustment.
- **SAVINGS IN MATERIALS** . . . average accuracies of from 0 to ± 3 ozs. guard against losses.
- **SAVINGS IN LABOR** . . . completely automatic equipment means reduced labor and handling expenses.
- **QUALITY CONTROL** . . . accurate measurement keeps quantities and proportions constant.

There's a national service organization behind every Richardson application—to keep your scales in prime condition and to advise you on special weighing and materials handling problems. Let us put to work for you our more than 55 years experience in the business of materials handling by weight. For more information call or write us today.

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY • CLIFTON, NEW JERSEY
Sales and Service Branches in Principal Cities

4978

Check 3116 opposite last page.

Lets five drum-handling operations be done safely, rapidly

Barrel lift keeps drum under control at all times

Uses: For handling steel drums.

Features: Unit enables one operator to raise, transport, rotate, tilt and drain 55-gal steel drum safely and speedily. All operations are performed with no undue strain on operator. Drum is under perfect control at all times.

Description: Drum-handling device has adjustable leverage feature for various weight drums from 500-1000 lb, and floor clearances from 5⅛ to 11½". Unit has all-steel, welded construction with rigid steel tube base and structural tube supporting members. It has rubber-tired wheels and ball bearing swivel rear caster. Self-locking safety-stops prevent accidental movement of handle. Tilt-locks secure drum in vertical position while moving, and horizontally while contents are drained. Drum returns to vertical after draining. Unit is shipped knocked-down and is conveniently assembled.

(Barrel lift is product of Morse Manufacturing Co., Inc., 727 W. Manlius St., East Syracuse, New York.)

Check 3117 opposite last page.

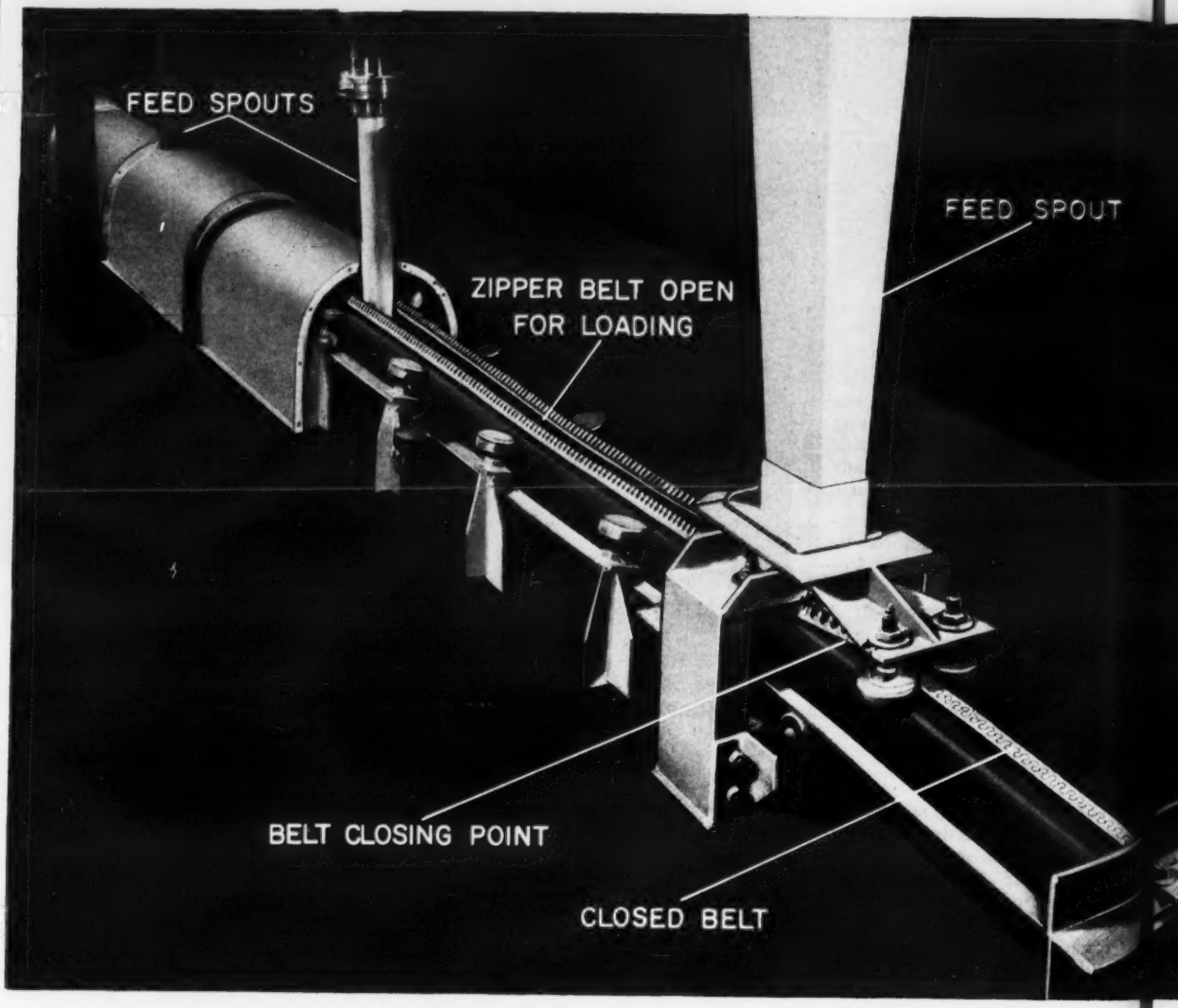
FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

FRAGILE BULK CHEMICALS ARE

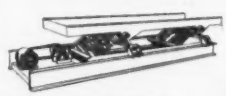


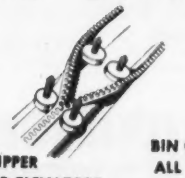
Above illustration shows how the S-A ZIPPER is loaded and then closed. Complete discharge occurs at unloading point. Belt may be thoroughly cleaned.

STEPHENS

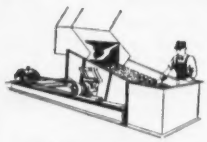
THE BIG NAME IN BULK MATERIALS HANDLING

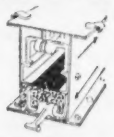
BELT CONVEYOR.


VIBRATING CONVEYORS


ZIPPER CONVEYOR-ELEVATORS

BIN GATES-ALL KINDS


VIBRATING SCREENS


REDLER CONVEYORS, ELEVATORS

E HANDLED GENTLY AND SAFELY by "ZIPPER" CLOSED-BELT CONVEYORS-ELEVATORS

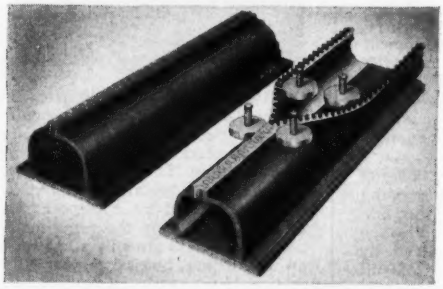
NO SEGREGATION—NO DEGRADATION OF MATERIALS

Bulk materials — granular, flaky, pulverized, or small lump — can be conveyed or elevated in any plane, entirely enclosed and protected by S-A ZIPPER belts. The most delicate materials are moved swiftly and economically, without degradation, or separation of particle sizes.

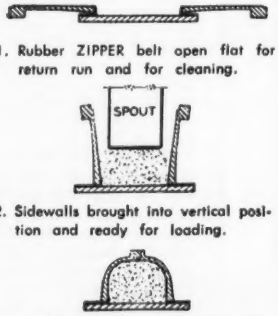
ZIPPER conveyors require no casing, can be used to carry over long distances, around obstructions in numerous flexible arrangements. The belt simply opens to receive material, then zips closed, sealing its load and forming its own dust-tight casing, moving material within the belt over a system of guide rollers and pulleys to any point of discharge.

The ZIPPER conveyor is exclusively an S-A product. It is ideally suited to materials requiring clean and gentle handling. Belt speeds range up to 200 F.P.M., discharge is possible at any point on horizontal, inclined, or vertical runs.

S-A designs and builds conveying systems for all bulk chemical handling requirements. If you have a problem and want expert help, call the S-A sales engineer in your area, or write to any of the main offices listed below. For complete catalog data on ZIPPER conveyors, write for a copy of bulletin 349.



Section views thru the endless ZIPPER belt show how load is completely enclosed. Belt teeth are automatically spread, meshed and locked by means of ball bearing rollers. Material moves forward with belt.



1. Rubber ZIPPER belt open flat for return run and for cleaning.
2. Sidewalls brought into vertical position and ready for loading.
3. Flexible sidewalls completely closed for conveying and elevating.

S-ADAMSON EQUIPMENT

S-A district or main plant offices can supply complete information on any conveyor product, or any phase of chemical product handling. Bulletins on all products are available upon request.

S-A MFG. CO.
MAIN OFFICE AND PLANT
11 RIDGEWAY AVENUE
AURORA • ILLINOIS

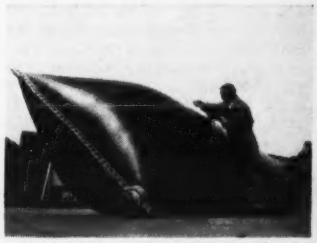
PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Check 3118 opposite last page.

Collapsible containers provide storage space for corrosive liquids

King-size 'toothpaste tubes' cut storage, handling costs

Resembling a giant toothpaste tube, rubber-fabric collapsible container, with lining fully resistant to action of most corrosive and hydrocarbon chemicals, provides economic semi-permanent industrial storage facility for corrosive liquids and other



Collapsible rubber-fabric containers provide practical, economical storage facility for corrosive liquids

hard-to-handle materials. Essentially, the container is a large, reinforced, synthetic rubber tube, having both ends sealed with flexible metal closures.

The tank is constructed of four plys of rubber-coated rayon tire fabric molded in a matter similar to that applied in making tires. The outer surface is a neoprene for oil and weather resistance, and inner surface can be of any one of the variety of rubber compounds.

Polyethylene bag is used as liner when eatable products are handled.

When empty, container is perfectly flat and can easily be rolled up. It does not require venting when being filled or emptied. Container fits readily into a closed system.

Besides providing an economical storage facility, roll-up feature of container makes possible return payload in liquid transportation service.

Tanks can be made in sizes to suit requirements of trailers, railroad cars, barges or ships, or in-plant storage. For trucks, the 3800-gallon size is

Magnetic ideas from ERIEZ

ATTRACTIVE UNDERWATER ATTRACTION! This attractive Miss is demonstrating the Magnetic Power of an Eriez HI-POWR Magnet. This idea of herculean strength (even under water) and permanent dependability is applied in practical ways in industry, where Eriez HI-POWR magnetic separators are used to remove tramp iron from processing lines before it can cause fires, machinery damage or product contamination. Eriez HI-POWR Magnets are also used to convey, control and hold metals, from small parts to large steel sheets and pipe. They are easily installed on new or existing equipment, and offer many automated materials handling advantages. *All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments; magnetic power is guaranteed forever. The first cost is the only cost.*

PIPELINE TRAP REMOVES IRON CONTAMINANTS FROM SLURRY! An Eriez Model B Ferrotrap (Pipeline trap) in use at B. T. Babbitt, Inc., Albany, New York, is trapping about 10 lbs. a month of tramp iron and scale. The unit is installed in a tank car unloading line which handles Alkyl-Aryl-Sulfonate slurry, a substance used in the manufacture of the company's product—Babbitt Built Detergent. The trap performs a dual function: it protects equipment from ferrous damage and results in better quality control. Model B Ferrotrap has a stainless steel casing, with threaded fittings to 2", 3" or 4" pipelines. Attached to the removable cover of the unit are multiple stainless steel rods with a lifetime-powered Alnico V magnet within each rod. These rods break up the flow of liquid into finer flows, which pass around the rods depositing iron or iron fines on the magnetic elements. This new design trap offers up to 400% more magnetic area than previous traps and can be installed in any position. Model B provides the ultimate in protection against ferrous contamination of liquids flowing through lines and is also available in a sanitary model for lines handling foods, beverages, drugs, etc.

About over-buying and under-protecting:

Eriez, leader in research and design of magnetic equipment, introduced virtually every type of permanent magnetic separator on the market today. Our products, designed to separate, retrieve and purify ferrous materials from non-ferrous materials, have found many and varied applications in industry.

To meet industry's ever-changing needs, Eriez is constantly developing and perfecting new models. Our laboratory and field staffs, backed by the know-how and versatility gained by solving magnetic problems of all types, are among the most skilled in this line. By studying your particular separation problem, they can and will recommend Eriez' *lowest-cost magnet* in proper *size, type and strength* to do the job best, without "over-buying", without danger of "under-protecting".

With Eriez Magnets your processing lines are protected from the fires, product contamination and machinery damage that tramp iron causes. To be sure you obtain at lowest cost the most effective installation for *your specific needs*, do as hundreds of other satisfied customers have done — look to Eriez *first!*

PIPELINE TRAP FINDS FINES IN PAINT LINES. At the Rinshed-Mason Co., Detroit, Mich., an Eriez Model L Ferrotrap (Pipeline trap) is used to protect automotive paints from ferrous contamination. The permanent-powered Ferrotrap is located directly at the outlet of a paint grinding mill where it traps minute particles of steel chipped off the grinding balls. Sometimes these chips are only a few thousandths of an inch in size, but the powerful action of the Alnico V magnetic element traps and holds them until the accumulated iron is removed. The Model L Ferrotrap consists of a long magnetic element, in an all-bronze housing with two openings in the upper side for attachment to pipelines of 1/2" to 2" diameter. Liquids flowing through the line come into contact with the magnetic bar, and deposit their iron contamination. To clean the unit, one end is unscrewed and the magnetic bar is removed with it and wiped with a rag. Model L provides dependable, economical protection against ferrous contamination.

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ HI-VI VIBRATORY EQUIPMENT

ERIEZ . . . pioneers and world's largest producer of Permanent Non-Electric Magnetic Equipment for Industry have three major product lines to serve your needs.

HI-POWR MAGNETIC SEPARATORS (like those shown above) to remove unwanted iron from processing lines.

HI-POWR MAGNETIC AUTOMATION UNITS to handle untold materials handling problems . . . convey, transfer, control, elevate, re-position, etc., ferrous materials or parts during many manufacturing processes.

And

HI-VI VIBRATORY EQUIPMENT to move and accurately feed bulk materials. ERIEZ "Magnetic Ideas" can help you. Eriez' factory-trained field men, backed by Eriez extensive laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey, and offer helpful "Magnetic Ideas."

WRITE FOR BIG NEW COMPREHENSIVE CATALOG OF ERIEZ ENTIRE LINE TODAY . . . state your particular problem and we'll try to assist. Eriez Manufacturing Company, 73A Magnet Drive, Erie, Pa.

ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

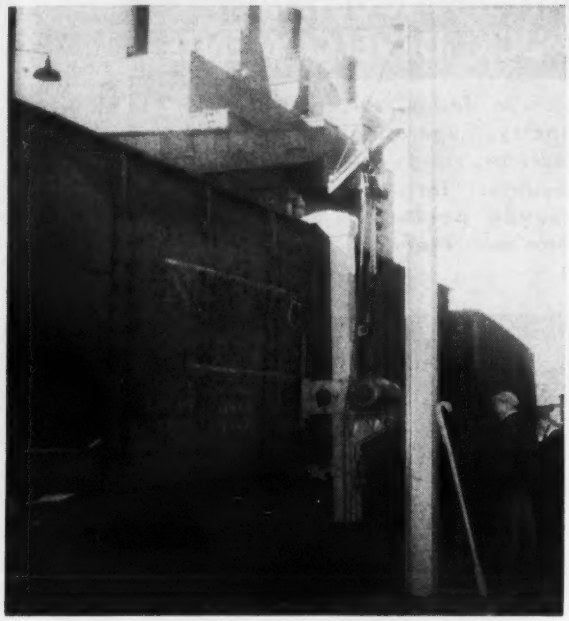
Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 3119 see information request blank opposite last page.



NATIONAL CAR SHAKER

UNLOAD...

hopper bottom cars

- **quickly**
- **easily**
- **safely**

and at low cost

Write for BULLETIN D showing how you can save up to 80% unloading sand, sulfur, ore, and other bulk chemical materials

NATIONAL CONVEYOR & SUPPLY COMPANY
357 N. Harding Ave., Chicago 24, Ill.

Check 3120 opposite last page.

most practical. The 6500-gallon capacity tank is most suitable for railroad service. In plans for the future are 10,000 to 20,000-gallon sizes for barges and ships, and industrial plants storage.

(Sealdtanks are a development of the United States Rubber Company, Rockefeller Center, New York 20, N. Y.)

Check 3122 opposite last page.

Electronic crane scale combines weighing and transporting

Great savings in time, space, and manpower are effected by manufacturer's electronic crane scale which combines weighing and transportation operations. Exact weight of heavy loads may be recorded on tape, ticket, or cards in cab located away from weighing area. Equipment is ideal for shipping metal or other heavy products.

(Ametron electronic crane scale is product of the Streeter-Amet Company, Grayslake, Ill.)

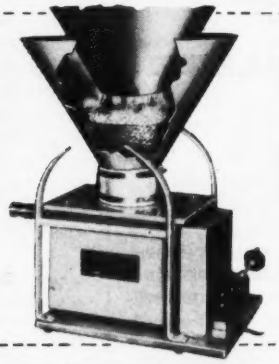
Check 3123 opposite last page.

THE MOST ADVANCED
DRY MATERIALS FEEDER IN INDUSTRY

PATENTED - TRADE MARK REG. - OTHER U.S. & FOREIGN PATS. PENDING

Vibra Screw
VERSATILITY
ACCEPTED INDUSTRY WIDE

FOODS	SOAP & COSMETICS	WATER TREATMENT
CHEMICALS	STEEL	PETROLEUM
PHARMACEUTICALS	BRICK & TILE	CEMENT
BREWING	TOBACCO	SAND & GRAVEL
PAPER	FLOOR COVERINGS	GLASS, ETC.



WITH SUPPLEMENTARY HOPPER

IN ANY SIZE--
CONTINUOUS FLOW RATES--
FROM
1 OZ. PER HOUR
TO
100 TONS PER HOUR
METERS SOLIDS LIKE LIQUIDS

UNMATCHED FOR:
ACCURACY—SIMPLICITY
RELIABILITY—RANGE

WITH FEEDER PIPE

Vibra Screw

For Complete Information Write To:
VIBRA SCREW, Dept. 1, 1 Montgomery Street, Belleville, N. J.

Check 3121 opposite last page.

Develops a Tote Bin for handling liquids

Similar to containers developed for handling dry materials, manufacturer's 300-gal tanks for liquids can be handled by any flat bed conveyance. No special truck body is needed; they can be hauled in ordinary stake body or van-type trucks or trailers. Tanks can also be shipped by rail car.

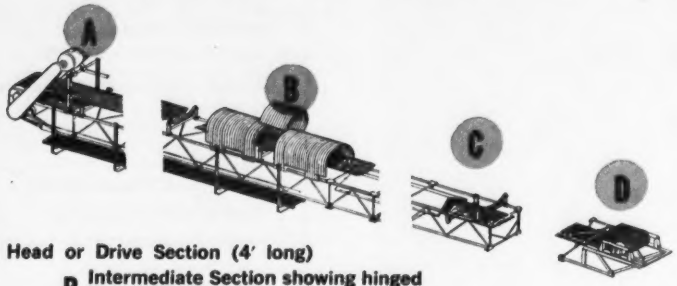
They are equipped with standard drum closure at top, permitting easy access to interior for filling, cleaning, and inspection. Contents can be discharged by either pumping out from top, or gravity discharge through bottom.

(Tote Tanks are product of Tote System, Inc., Beatrice, Nebraska.)

Check 3124 opposite last page.

NEW IDEA in prefabricated belt conveyors

JOY READY-SPAN tubular design requires no special engineering



A Head or Drive Section (4′ long)

B Intermediate Section showing hinged cover (20′ –8′ –4′)

C Intermediate Section showing optional return belt cover

D Tail section showing takeup and belt plow (4′ long)

Just tell us the length, the speed, and the material you want to move and we can pull a Ready-Span prefabricated conveyor "off the shelf" for you. You'll get all the economies of pre-engineering plus all the advantages of a conveyor installation tailored to your needs.

Here's how it works: each section, including drive and tail terminals, is made up of four pipes connected by pipe diagonals forming a lace framed truss. Sections bolt together to form a straight, rigid, pipe frame truss.

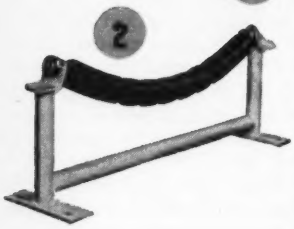
All accessories—idlers, walkways, cover decking, hoods and supports clamp to the pipe anywhere you wish—without burning holes or using pre-arranged multiple holes that weaken the conveyor.

The Joy Ready-span is available in a variety of drive and take-up combinations for any standard belt width. Promptly available from stock to meet almost any handling condition.

Write for Bulletin 218-80

NEW IDEA in conveyor belt idlers

JOY LIMBEROLLER



Radically different from all other idlers, the Limberoller is a single roll idler consisting of neoprene discs molded to a flexible steel cable. The entire idler turns on its own axis. (1) Only two bearings are used, one at either end, up out of the dirt. (2) The idler supports the belt across its entire width . . . eliminates gaps left by ordinary 3-roll idler. This even support, combined with cushioning "no-bump" action of neoprene discs, can increase belt life 6 times and more. The Limberoller can be installed on *any* belt conveyor, even on existing conveyors.

Write for Free Bulletin 218-80A

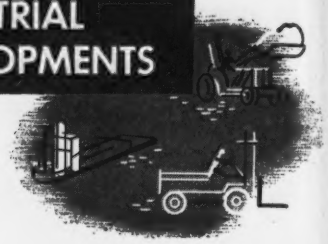
WBW L6967-218

JOY *Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*

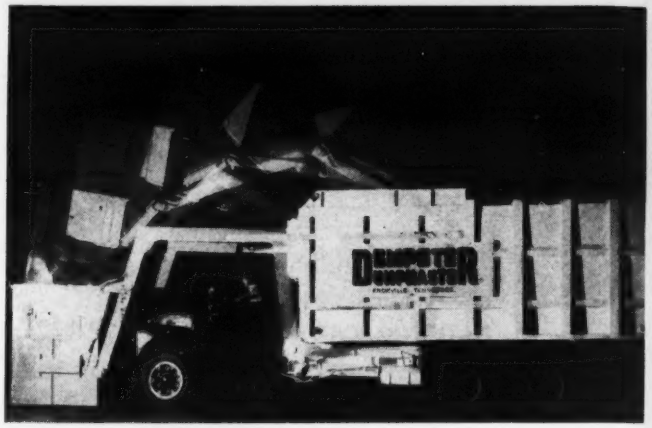
In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Check 3125 opposite last page.

LATEST INDUSTRIAL TRUCK DEVELOPMENTS



. . . in design, capacity, operating features, and accessories for improved performance and safety



Cantilever construction . . .

. . . of lifting arms affords a safe, fast method for picking up and dumping manufacturer's line of waste storage containers located at points of waste-accumulation throughout an industrial plant. At a large Minnesota plant, one such unit is handling a system of 125 containers, some of them several times a day.

Pick-up, dumping, and returning cycle requires less than 60 seconds and is performed without driver leaving cab. One 6-cu-yd container holds equivalent of 40 thirty-gal trash cans.

Moving from location to location, driver fits lifting arms into pick-up channels on sides of containers, and dumps contents through top bay of the compaction body where average waste is hydraulically compressed to one-third its former volume. This permits truck to load more than 60 cu yd of material before traveling to disposal area.

Companies will be able to obtain this new service on either an outright purchase basis or through area contract haulers who place containers in plants and empty them on a fee basis. (CA Dumpmaster is manufactured by Dempster Brothers, Dept. DM-96, Knoxville 17, Tennessee.)

Check 3126 opposite last page.

Power steering . . .

. . . is now available on manufacturer's line of pneumatic-tired industrial lift trucks in 3000-, 4000-, and 5000-pound capacity range. Other features of trucks include large pneumatic tires for good traction in both inside and outside operations, dual-tired trunnion steering assembly, and overall functional design.

Power steering system assures fast, immediate, and dependable steering action because of use of flow divider in hydraulic system that always directs fluid first to power steering unit.

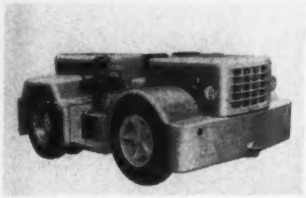
Power steering is available on pneumatic-tired lift trucks of Hyster Company, 2902 N. E. Clackamas Street, Portland 8, Oregon.

Check 3127 opposite last page.

Versatile towing tractor . . .

. . . develops 15,000 pounds of drawbar effort and features power steering, four-wheel-power brakes, power-shifted transmission, dual rear tires, planetary-type final drives, and choice of gasoline, or LPG power. Travels to 22 mph.

Tractor is compact, highly maneuverable unit ideally suited for movement of loads

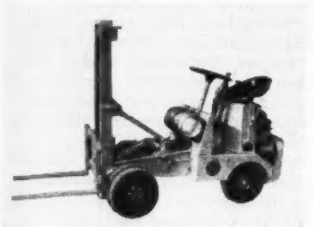


up to 250,000 pounds in industrial, rail, or motor truck terminal applications. Paymover Model T-150 tractor is product of the Frank G. Hough Co., 744 Seventh Avenue, Libertyville, Illinois.

Check 3128 opposite last page.

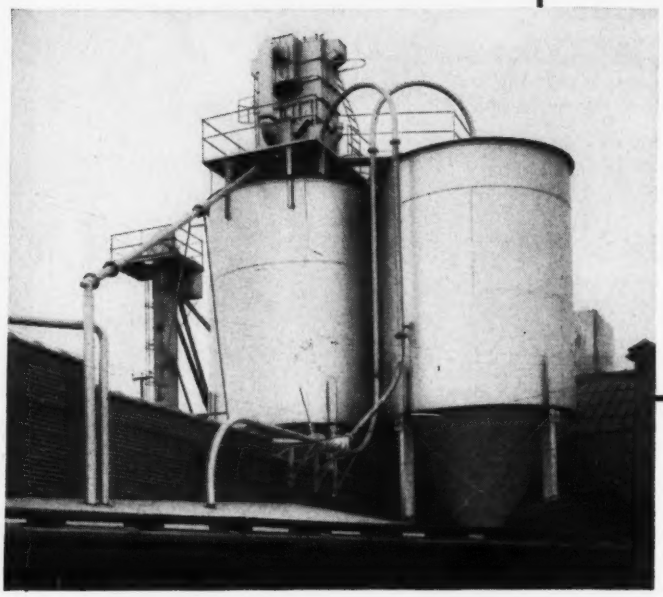
LP gas equipment . . .

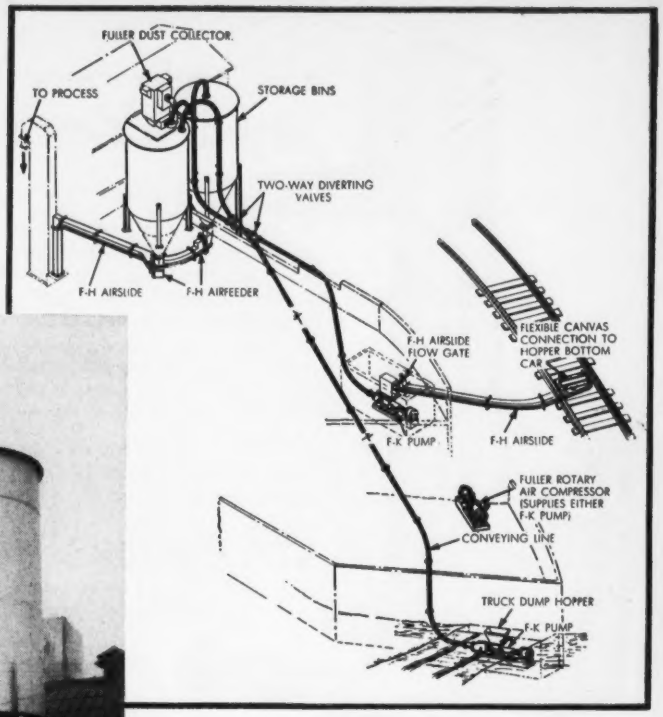
. . . is newest innovation on manufacturer's industrial truck built for use as flat bed, hopper, or fork-lift carrier. Featured as an economy measure, lower price of LP gas, plus reduced losses due



to spillage and evaporation result. Manufacturer claims increased savings through longer engine life and less maintenance when LP gas is used. LP gas equipment is available on R-10 and R-15 "Motor-Bug" industrial truck models of Kwik-Mix Co., Division of Koehring Company, Port Washington, Wis.

Check 3129 opposite last page.





Unloading and Conveying System By FULLER--- Pays Off In Lower Operating Costs for *Certain-teed*

A few years ago, Certain-teed Products Corporation decided to find, if possible, more economical methods of operation in its York, Pa. plant. One problem given serious consideration was the handling of incoming limestone and slate filler dust received in bags, requiring costly, manual labor, resulting in breakage of bags with consequent loss of material and a dusty condition in the plant.

Together, Certain-teed and Fuller engineers made studies of their layout and came up with a solution—a combination of the Fuller-Kinyon Conveying System and F-H Airslides®.

Two Fuller-Kinyon Pumps are used. One conveys limestone dust from hopper-bottom cars, utilizing the Airslide to convey from cars to the pump located in a pit in the plant. This pump conveys to either one of the two storage bins . . . efficient, clean, rapid transfer from cars to storage. The other pump handles the slate dust, delivered in trucks, also conveying to storage. Withdrawal of either material from storage bins is accomplished with Airslides, which discharge to an elevator delivering to process.

Air for the pumps is supplied by a Fuller Rotary Single-stage Compressor, having a capacity of 482 c.f.m. at 20-lb. pressure. Low-pressure air, for the Airslides, is supplied by a small blower.

It is reported that the savings realized by the use of this Fuller system has paid for the installation in less than two years of operation.

Possibly your materials handling is antiquated and costly, which could be remedied by a comparatively small investment. Fuller's 30 years experience in pneumatic conveying of dry bulk materials can very well bring about substantial savings in your plant's operation. Why not write today for further information? No obligation at all.

See Chemical Engineering Catalog for Details and Specifications

G-170
4424

FULLER COMPANY
GENERAL AMERICAN

Fuller
. . . . pioneers in harnessing AIR

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

Check 3130 opposite last page.

modernize with
HydroLectric

A GREAT NAME IN LIFT TRUCKS

- Two driving wheels instead of one
- Braking with handle in any position
- Automatic parking brake (optional)
- Sealed alloy gears instead of chains
- Sealed ball-bearing rollers in masts
- 100% more steering ease with two wheel drive
- Power unit removal complete in 20 minutes
- Greater tire capacity equivalent load ratings

The only truck with 2 driving wheels and 2 braking systems. In fact Hydrolectric does everything a good lift truck should do.

LIFT TRUCKS, INC.
2427 Spring Grove Avenue
Cincinnati 14, Ohio

STUEBING *Designed Engineered • Built*

There is a truck for every purpose to handle any kind of material.

Check 3131 opposite last page.

thrifty... versatile

EASTERN PORTABLE MIXERS

Portable mixers provide the thrifty answer to many mixing problems. Versatile Eastern Mixers can be quickly shifted from task to task to allow one mixer to serve many needs.
Available from 1/20 to 5 H.P. with a variety of speeds and motor enclosures, your small investment in an Eastern Portable quickly pays for itself even if your needs are infrequent and varied.

For complete portable mixer information, write for Eastern Bulletin 520-C.

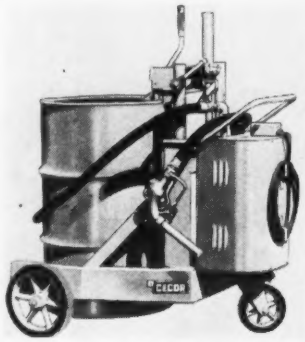
Eastern INDUSTRIES, INC.
Regent St., E. Norwalk, Conn.

Check 3132 opposite last page.

Compact drum dispenser takes load off operator, won't spill liquids

Uses: For transporting drums to point of use, and direct-from-drum electrical pumping.

Features: Compact unit travels smoothly in crowded aisles. No load or weight is placed on operator. Open-top drums of liquid may be carried without spillage.



Easy one-man method of transporting drum features direct-from-drum dispensing

Description: Drum dispenser has ½-hp electric motor mounted beneath handle, 15 gpm pump, two 12-inch heavy duty wheels, and one 8-in caster. There is also a neoprene dispensing hose with trigger type nozzle, and neoprene barrel hose. Clamp is adjustable for all drums and chime thicknesses. In operation, a drum weighing as much as 1000 lb is clamped in positive locking vice and raised hydraulically in upright position for carrying.

(CeCOR Model 76E is product of Coolant Equipment Corp., Verona, Wisconsin.)

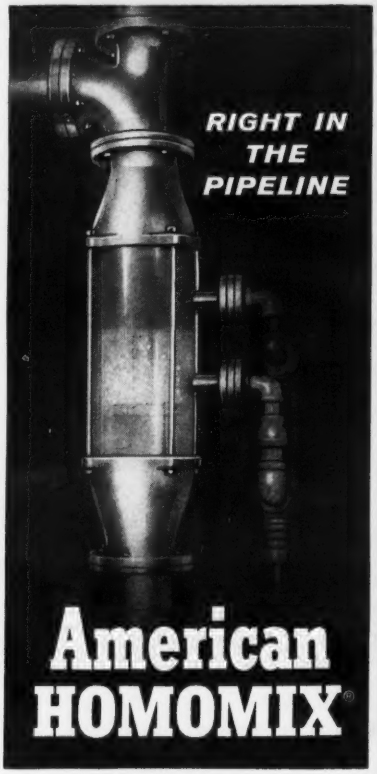
Check 3133 opposite last page.

Accumulator functions

Manufacturer's bulletin describes functions of an accumulator in hydraulic system of an industrial lift truck. Lift truck accumulator bul — Yale Materials Handling Div., The Yale and Towne Manufacturing Company, 11000 Roosevelt Blvd., Philadelphia 15, Pa.

Check 3134 opposite last page.

CONTINUOUS
LIQUID, GAS OR SLURRY
CHEMICAL MIXING



American HOMOMIX®

Gives instant, uniform, complete mixing
without a mixing tank

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)

IN OUR 90TH YEAR

AMERICAN WELL WORKS
Mixing, Pumping, Water & Waste Treatment Equipment
150 N. BROADWAY, AURORA, ILLINOIS
Sales Offices: Chicago, New York, and other principal cities

Check 3135 opposite last page.

PETROCHEMICALS SECTION

—will be starting in next month's CHEMICAL PROCESSING and will carry news on the booming worldwide petrochemical industry.

Designed for Management

Section will be especially designed to meet the needs of petrochemical management.

It will probe the meaning of petrochemical developments here and abroad. Engineering-type articles telling how costs can be cut, labor saved, or products improved will be carried.

Material on petrochemical processes will be featured.

Reports study on petrochemicals

February issue will lead off with results of a study CHEMICAL PROCESSING made in cooperation with a number of petrochemical leaders.

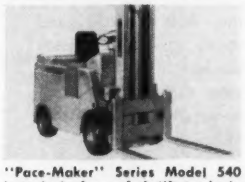
Report indicates petrochemical industry will top growth rate for either petroleum refining or chemical industry.

For more information on product at right, specify 3136 see information request blank opposite last page.

Today's industries need Towmotor Continuous Operation

New Towmotor **"Lift & Shift"** Control Raises Productivity - and Profits

Towmotor Standard Accessories that grab, scoop, push-and-pull, ram, revolve and even shift sideways, offer versatility that saves manhours and dollars daily.



"Pace-Maker" Series Model 540 is typical of new fork lift trucks in the combined Towmotor-Gerlinger line. Load capacities from 1500 to 40,000 pounds.

Driving Ease More Than Tripled with new Towmotor power steering! TowmoTorque Drive adds cushioned "creep" control unequalled in the industry today.

It's easy to see how Towmotor fork lift trucks built a reputation for modern mass-handling efficiency! Take a look at the time-saving Side Shifter TowLoader Accessory in the picture.

This fingertip controlled attachment—combined with Towmotor "no-loss" hydraulic power—lifts, lowers and positions loads to either side for accurate, systematic stacking. *Actually pulls loads onto the forks, then pushes them off!*

More work gets done with less fatigue. Motion-saving centralized control — cushioned-comfort seating—dual entry compartment—high free lift—and other standard features give you convincing reasons for buying modern Towmotor-Gerlinger fork lift trucks.

For latest information on the industry's most complete line, send coupon below.

Leaders for 39 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR - GERLINGER
THE ONE-MAN GANG

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

☐ Send free Towmotor Catalog No. SP-23
☐ Send free Certified Job Studies relating to our business, which is

Name_____

Company_____

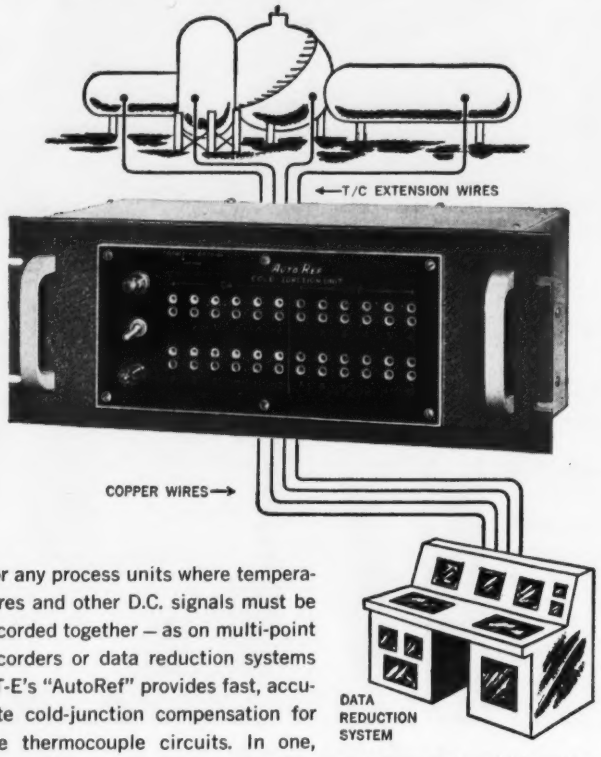
Address_____

Mail to TOWMOTOR CORPORATION, Cleveland 10, Ohio

T-E's *AUTOREF*® Provides

Cold Junction Compensation For Many Thermocouples

Ideal For Data Reduction Systems



For any process units where temperatures and other D.C. signals must be recorded together – as on multi-point recorders or data reduction systems –T-E's "AutoRef" provides fast, accurate cold-junction compensation for the thermocouple circuits. In one, compact unit it gives you constant, pre-determined, cold-junction reference for many thermocouples – actually up to several hundred. Typically, cold-junction temperatures can be controlled to within ±1°F. over a wide range of ambient temperatures.

Besides its accuracy, the "AutoRef" offers tremendous convenience – saving both time and effort. Designed for panel rack mounting, it can be introduced anywhere in the thermocouple circuit – no matter where thermocouples and instruments are located. Whenever temperatures, pressures, flow-rates and other electrical and mechanical conditions are being recorded simultaneously, the "AutoRef" does away with the need for maintaining ice baths or making laborious correlations. It is available for all standard thermocouple calibrations.

Write for Bulletin 81-R.

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY
In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

Check 3137 opposite last page.

cp **SAFETY**

B. F. Goodrich Chemical Co.'s Avon Lake Development Center, twice in the last three years, has completed periods of over one million man-hours without a lost-time injury. One big factor behind this safety record is fact that the company . . .

Gets 100% cooperation on wearing safety glasses

GEORGE V. MICHAEL, Assistant Editor
With **PAUL W. ORMSBY,** Safety Engineer
B. F. Goodrich Chemical Co.
Avon Lake, Ohio

At B. F. Goodrich Chemical Co.'s Avon Lake, Ohio, Development Center, safety engineer Paul Ormsby has been successful in obtaining complete cooperation for mandatory wearing of eye-protection equipment.

As a result, one of the biggest headaches of a plant safety engineer has been cured. It is this, combined with a very effective safety program highlighted by extensive use and maintenance of safety equipment, that gives the Center an enviable safety record.

In 1956, an 18-month period of over one million man-hours was completed without a lost-time accident. This was the second time in three years that the plant has achieved the same honor. Record involves some 600 employees, most of whom are in contact with chemicals.

Regulations concerning the use of eye-protection equipment include mandatory wearing of safety spectacles *everywhere inside the plant grounds,* and mandatory wearing of goggles in specified areas.

When an employee is hired, he is told during his orientation that the wearing of safety glasses and goggles is mandatory and that failure to comply with the same may result in termination of employment. Each supervisor is held responsible for enforcing this procedure.

At first glance, it may appear that this is being overstrict. In practice, however, the policy has proved itself by building up good employee relations. Ormsby has done a good job of selling safety through supervisors and foremen. Through them, employees have fully realized the why's and wherefore's of the good safety procedures and what they mean to them and their jobs.

What happens if someone doesn't cooperate? In the processing areas, it has become standard practice to use the following step-wise procedure to enforce the regulations:

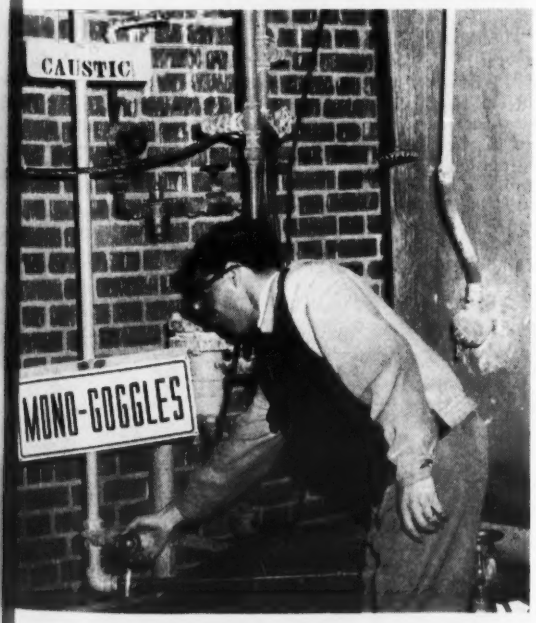
1) Two verbal warnings by employee's foreman.
2) Safety talk and warning by supervisor.
3) Reprimands and warnings of severe penalty which may follow if employee continues to be non-cooperative. (There has never been an instant where such actions were necessary.)

Safety glasses and goggles are standard issue to all employees. A safety glass whose frame is stamped from sheet stock was chosen as standard

To page 158

B. F. Goodrich safety engineer, Paul Ormsby, can be rightfully proud of the many National Safety Council and State of Ohio awards in recognition of Avon Lake Development Center's safety record. In the past three years there have been two periods of over one million man-hours each without a lost-time accident. Big factor behind record is effective program covering wearing of eye-protection equipment

Full employee cooperation has been obtained on mandatory wearing of goggles in specified areas, which are well-defined by signs such as shown



A FEW DOLLARS IN

AMPCO® SAFETY TOOLS

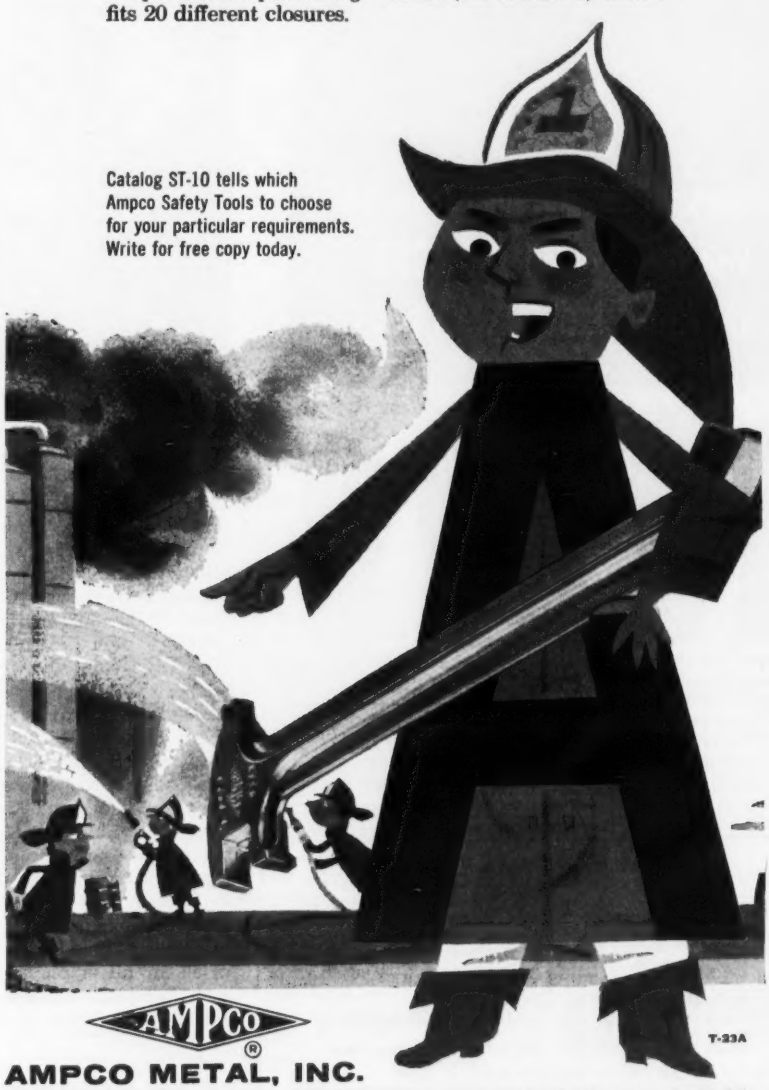
COULD HAVE PREVENTED THIS!

What if fire or explosion hit your plant tomorrow? Think of the damage that could be done — the lives and the time that could be lost! Unless you have money to burn, it's simply too expensive to gamble on going without the low-cost protection of Ampco Safety Tools in hazardous areas.

Factory Mutual Laboratories approve Ampco Safety Tools for use in any location where a hot spark could mean paralyzing disaster.

Ampco has the world's most complete line of safety tools — more than 400 types and sizes — including the Ampco All-Purpose Bung Wrench (shown below) which fits 20 different closures.

Catalog ST-10 tells which Ampco Safety Tools to choose for your particular requirements. Write for free copy today.



AMPCO®

AMPCO METAL, INC.

Dept. CP-1, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif. • In Canada: Safety Supply Co., Toronto, Ont.

Check 3138 opposite last page.

From page 156

equipment. This produces a strong frame not easily broken. Another feature is that the lens cannot be snapped in and out easily. This lessens chance of lens coming out upon impact from an object.

In the event an employee is hired that is already wearing prescription glasses, he is required to furnish the safety engineer, within 10 days, a prescription paid for by himself.

Company has available approximately 10 samples of frames, ranging from $1.60 to $15.00, from which the employee may choose. Company pays $1.60 on any frame selected, plus the entire lens fee. Thus, the most an employee would have to pay if he chooses the more expensive frames is $13.40.

Wearing of safety glasses is mandatory everywhere inside plant grounds. Goodrich has obtained everyone's cooperation on this

All prescription glasses are handled by an optical company in Cleveland. Goodrich also has made available a service to individuals requiring eye examinations. A medical doctor was contacted concerning such a service, and a price was agreed upon — one price for all employees. However, employees are free to select their own optometrist or MD.

Prescriptions over one year old are not accepted. Likewise, all prescriptions over one year old on file with the

Workers willingly wear *comfortable* knit-cotton lined PIONEER Liquidproof Gloves All Day

NL-34 NL-42 NL-52 VL-34 NS-35*

Pioneer Knit-Cotton Lined Gloves with Non-Slip Grip

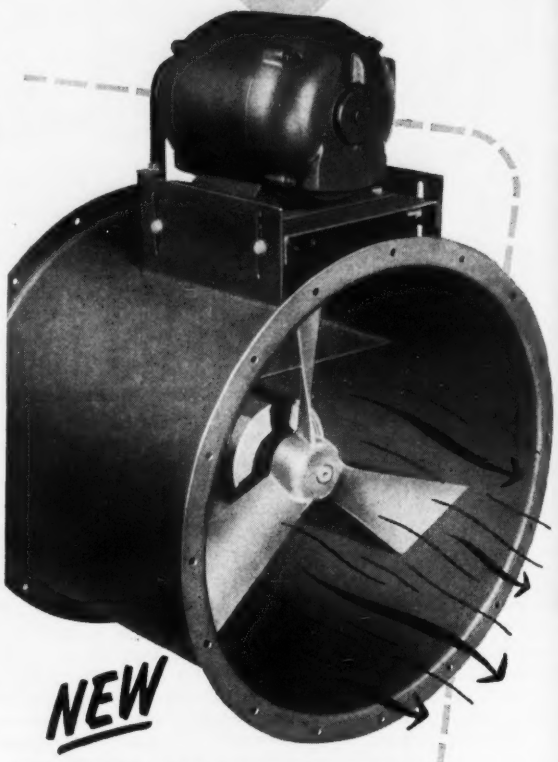
Style	Material	Weight	Color	Lining	Length
Stanzoil NL-34	Neoprene	Light	Blue/Black	Knit Cotton	10½"
Stanzoil NL-42	Neoprene	Heavy	Blue/Black	Knit Cotton	12"
Stanzoil NL-52	Neoprene	Heavy	Blue/Black	Knit Cotton	14"
Stanflex VL-34	Pylox	Medium	Red	Knit Cotton	10½"
Stanzoil NS-35	Neoprene	Light	Red	Cotton Flock*	10½"

Write for our Industrial Glove Line Catalog and price list and the name of your nearest Pioneer Distributor. If you have a hand protection problem send a description to our "Hand Protection Clinic" for our glove recommendation.

the PIONEER Rubber Company
241 Tiffin Road, Willard, Ohio

Check 3139 opposite last page.

expel FUMES, HEAT AND DUST at LOW COST



NEW PROPELLAIR® belt driven Tubeaxial Fans

Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-C

R&M PROPELLAIR®
DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO

Certified Ratings (PFMA)

MAN COOLER SKY-BLAST VANEAXIAL EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

Check 3140 opposite last page.

dispensing optician are destroyed.

Paul Ormsby believes that comfort in wearing safety glasses comes with willingness to wear them for a period of time. It is just a matter of getting used to them. When program was initiated some complained about having to wear them. After several weeks, he discovered that many were wearing the glasses out to lunch and even when they go home.

Success of the program is a matter of record. To date, nine eye accidents have occurred that would have resulted in partial or complete loss of sight to either one or both eyes had the employees not been wearing eye protection.

When an employee has had the sight of his eye saved by the wearing of eye protection, he is enrolled in the Wise Owl Club. This nation-wide club is sponsored by National Society for Prevention of Blindness. On becoming a member, an employee is ceremoniously presented a membership certificate in recognition of his adherence to safety rules.

(Plano safety glasses and Monogoggles are manufactured by Willson Products, Inc., Div. of Ray-O-Vac Co., 567 Thorn St., Reading, Pa.)

Check 3141 opposite last page.

(Series #29 Saf-I-Chem goggles are manufactured by United States Safety Service Co., 1535 Walnut St., Kansas City 8, Mo.)

Check 3142 opposite last page.

FLAMMABLES ENGINEERING BY PROTECTOSEAL

FLAMMABLES CONTROL METHODS AND PRACTICES IN PRODUCTION, PROCESSING AND IN MAINTENANCE

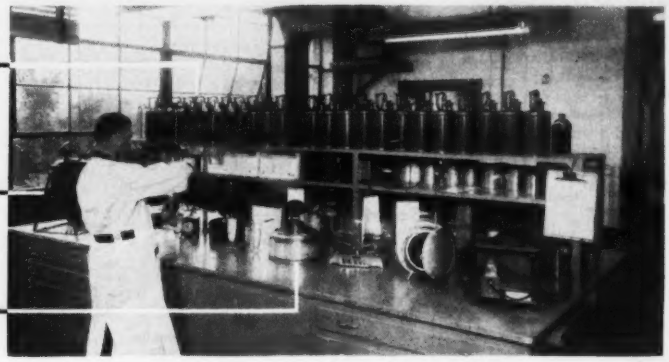
PUBLISHED BY THE PROTECTOSEAL COMPANY, CHICAGO, ILLINOIS • WAREHOUSES: CAMDEN, N. J.; LOS ANGELES, CALIF.

Fire-explosion controls for the industrial laboratory

Space-saving shelf storage. Convenient, oval shape containers now safely store more liquids in limited shelf area.

Fire-safe accurate dispensing. Full pouring control avoids hazard of spillage. No lifting of heavy, awkward unsafe cans.

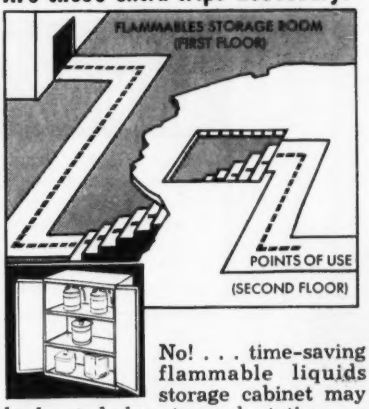
Fast, controlled waste disposal. Provides fire-safe disposal and removal of waste liquids from laboratory work stations.



Specially designed safety containers eliminate constant hazard of awkward, hard-to-handle, leaky, makeshift cans and bottles. Oval shape safety containers require far less shelf space than ordinary unprotected round cans . . . easily labeled for quick identification. Safety dispensing container on tilt-frame has special fire-protective top faucet . . . provides visual, controlled transfer of liquids to smaller laboratory containers . . . simply tilt and pour. Wide-mouth chemicals disposal can safely provides for elimination of waste chemicals . . . does away with hazardous practice of pouring chemicals into sink drain.

For Further Information Request Laboratory Safety Equipment File No. 67

Are these extra trips necessary?



No! . . . time-saving flammable liquids storage cabinet may be located close to work station . . . within the plant or laboratory . . . permits convenient storage of up to 45 gallons of flammable liquids at-the-job . . . stops wasteful, time-consuming trips to remote storage vaults. Built to N.F.P.A. specifications.

For Further Information
Request Flammables Storage Cabinet File No. 55

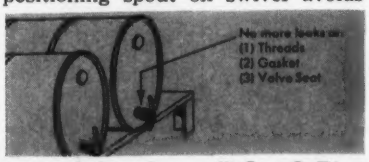
Reduce corrosion losses in flammables handling equipment

Certain liquids used in chemical industries found to corrode standard terne plate storage-dispensing containers . . . cause contamination of contents . . . weakening of body seams. Tests show special metals, such as stainless steel, often best suited for these liquids . . . other types may require monel metal or hot tin dipped coatings. Protectoseal engineers design and build custom special-purpose equipment to meet individual requirements.

For Further Information
Request Special Metal Containers File No. 74

Saves costly drum faucet repairs—replacements

Stainless steel construction eliminates corrosive action and contamination of liquids. No leakage! . . . self-positioning spout on swivel avoids



stripped threads . . . Teflon O-Ring Gasket universally impervious to all liquids . . . no wrench-pressure damage to valve seat located at inlet end of faucet. Result—flammables . . . and corrosives . . . dispensed safely . . . fewer faucet repairs . . . far longer faucet life.

For Further Information
Request Drum Dispensing File No. 68

Plant waste disposal hazards can be avoided

Good housekeeping begins at the job . . . with safety waste disposal cans located at *each* work station . . . prevents hazardous pyramiding of wastes within the plant . . . avoids possibility of overloading wastes in one area with the hazard of spontaneous combustion fires . . . keeps plant and lab premises safe, orderly.

For Further Information
Request Safety Waste Containers File No. 57

How to avoid excessive corrosion losses on tank safety vents

Secure individual types of corrosion-resistant metals for valves, flame arresters, housings. Precision engineered vent designs are available in wide choice of special metals . . . insure longer working life . . . fewer inspections . . . less parts replacement. Combinations of metals to meet individual problems of corrosive vapors and atmospheric conditions include the following:

Aluminum **Stainless Steel** **Brass**
Cast Iron **Bronze** **Monel** **Hastelloy**

AT YOUR SERVICE . . .
Specialized experience in flammables engineering from Protectoseal Field Engineering Service. Provides practical ideas and safe, cost-saving hints on storage, handling and use.

C. R. "Connie" Seim serving the Pacific Coast states.

THE PROTECTOSEAL COMPANY
1932 So. Western Ave., Chicago 8, Illinois
In Canada: Safety Supply Co., Toronto

Check 3143 opposite last page.

FOR MAXIMUM SAFETY

all over your plant use Safety GRIP-STRUT

Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Work Platforms

Flooring

Machine Guards

Balconies

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer — warm in winter

Big Economy Features

- ★ For balconies — no extra light needed below — no extra heat.
- ★ No extra supports necessary — channels are integral part of the material
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

Write for Catalog

PRODUCTS DIVISION

THE GLOBE COMPANY • *Manufacturers since 1914*

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Check 3144 opposite last page.

HOW TO BATCH OR BLEND LIQUIDS

Accurately, Safely, Automatically

Use

ROCKWELL LIQUID METERS

with Automatic Quantity Control Valves

This simple Rockwell system brings *automation* to the liquid process industry. To operate, you pre-set the quantity on the meter register—then open the valve. When quantity is measured, the valve closes automatically *and without shock*. This meter system eliminates human errors in compounding formulas. It's quicker and less costly than batch tanks or weigh scales . . . safer, since a closed metered piping system avoids the hazards of fumes and contamination. Available in stainless steel, bronze, steel or all-iron construction. Get full facts by writing Rockwell Manufacturing Company, Pittsburgh 8, Pa. Dept. 106A

Check 3145 opposite last page.

SAFETY

Safety bonnet design on needle valves

Uses: For high-pressure chemical and petroleum service.

Features: Safety bonnet design meets most exacting safety requirements.

Description: Forged steel needle valves are available in ¼, ⅜, ½ and ¾" sizes.

(Needle valve is product of August Spindler & Sons, Inc., 244 Mercer St., Jersey City 2, New Jersey.)

Check 3146 opposite last page.

Light-weight respirator comfortable to wear, adequately protects

Features corrosion-resistance, withstands sterilization

Uses: For protection against exposure to toxic matter.

Features: Light-weight, compact unit is easy to carry, comfortable to wear, yet provides adequate protection.

Description: Made of corrosion-resistant materials, respirator withstands corrosive atmospheric contaminants, washing in boiling soap solutions, or sterilization in autoclaves. Low-resistance inhalation valve gives ease of air intake, but protects filter from exhaled air and moisture. Although easily replaceable, the mouthpiece withstands long wear. Construction prevents

Compact, easy-to-carry pocket respirator gives adequate protection to workers subject to occasional or accidental exposure to toxic matter

This NEW Manual Starter has EVERYTHING!

NEMA Sizes 0 and 1

Two, three and four-pole construction

Write for **BULLETIN 2510 B-C**

Square D Company, 4041 N. Richards St., Milwaukee 12, Wis.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Check 3147 opposite last page.

see dangerous processes safely with

LENOX INDUSTRIAL PERISCOPES

Use a LENOX PERISCOPE to view hazardous processes and thus avoid danger and remove inaccessibility. These periscopes pass through walls, explosive or contaminated atmospheres, around corners and obstructions to permit the study and control of some phase of industrial work from a remote point.

A window on your industrial process

- A LENOX PERISCOPE is a tubular viewing device (often including angular bends) in which a distant image is carried through lenses and prisms to the eye.
- Angle of view or magnifying power can be modified by built-in mechanisms to change objectives or to operate scanning devices in the viewing head. This permits considerable flexibility in following moving objects or hazardous processes.
- Provision for high pressures, temperatures or harmful radiation can be furnished.

Let a LENOX PERISCOPE be a window in your industrial process. Write, wire or call with details of your application and for a bid on a suitable instrument.

LENOX INSTRUMENT COMPANY

RIttenhouse 6-6653

2010 CHANCELLOR STREET, PHILADELPHIA 3, PA.

Check 3148 opposite last page.

cartridge from touching or pressing against wearer's chin.

Respirator body is of nylon, mouthpiece of soft vinyl plastic, and nose clamp is flexible tempered steel coated with vinyl plastic. Filter cartridges protect against airborne particles, vapors and gases. Valves are leakproof.

(Pocket respirator is product of Safety Products Div., American Optical Co., Southbridge, Massachusetts.)

Check 3149 opposite last page.

Gas mask features built-in frames for spectacles

As an aid to gas mask wearers who require eye glasses for safe, accurate vision, manufacturer has developed face piece with built-in spectacle frames. Face piece incorporates a support bracket that mounts a spectacle frame for standard lenses, ground for wearers prescription. This assures perfect mask fit around temples and ears and eliminates leakage encountered when masks are worn over usual glasses with ear hooks or temple frames.

Built-in spectacle frames assure perfect fit, eliminate leakage

Mask has large plastic outer lenses shaped to provide adequate space for wearing glasses comfortably, and safely. It is furnished complete with spectacles made to wearer's prescription, or supplied with spectacle frames only.

("Spec" mask is available from Acme Protection Equipment Co., 1219 Kalamazoo St., South Haven, Mich.)

Check 3150 opposite last page.

BIFURCATOR® FAN

key to your corrosive fume removal problems

BIFURCATOR is the divided-housing fan backed by 30 years experience in design and application.

Ideal for corrosive, high temperature and hazardous fume removal from:

CERAMIC KILNS
CERAMIC PLANT INSTALLATIONS
CHEMICAL PLANT INSTALLATIONS
CHEMICAL LABORATORY HOODS
CORE BAKING OVENS
DRYING OVENS
DYE HOUSES
ELECTROPLATING TANKS
FOOD PROCESSING OVENS
FOUNDRIES — POURING AREAS
FOUNDRIES — SHAKE-OUT AREAS
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SLASHERS
STRIPPING TANKS
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☐ Send Bulletin DB-37-55 containing complete data on the Bifurcator for exhausting fumes.

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ATTENTION MR.

Check 3151 opposite last page.

Patent No. 2,722,372. Other Patents Pending.

THE WORLD'S MOST EFFICIENT POWER EXHAUSTER FOR INDUSTRY

. . . FOR INSTITUTIONS

. . . FOR RESIDENCES

★ STATIC PRESSURE UP TO 12 INCHES
★ NO MOTORS, FANS OR BEARINGS IN EXHAUST LINE
★ NEEDS NO STACKS ★ ACID RESISTING FINISHES

FOR INDUSTRY, Quickdraft provides up to 12 inches static pressure to **exhaust** paint spray, abrasives, corrosive gases, noxious fumes and high temperatures . . . **move** grains, powders, salts and trimmings . . . **recover** metallic waste from foundry stacks. It reduces maintenance costs . . . eliminates down-time for cleaning and replacing fan blades.

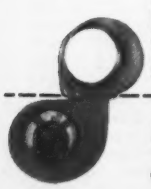
For INSTITUTIONAL AND COMMERCIAL BUILDINGS, Quickdraft eliminates costly, tall and unsightly stacks. It vents incinerators, heating plants and water heaters at roof level . . . safely and efficiently.

For RESIDENCES, Quickdraft maintains constant draft for efficient and economical combustion of all fuels. It keeps chimneys dry. It eliminates pulsating or chattering, puffing, smoking and sooting.

Write for QUICKDRAFT ENGINEERING DATA on your application . . . today.

N-587-QD

IMPORTANT NOTICE
For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel. No. 316 Stainless Steel, rigid plastics (P.V.C.), and with plastic and Fiberglas coatings.



Quickdraft CORPORATION

P. O. Box 87-Q
Dueber Hampden Bldg.
Canton 1, Ohio

Check 3152 opposite last page.

SAFETY

Protection from corrosives by synthetic garments of Dynel, Orlon

Non-absorbant, non-shrinking — washable

Uses: For protection of personnel exposed to corrosive fumes, dusts, and acids.

Features: Garments are unaffected by acids, alkalis, and most organic chemicals in common industrial use. They are reported to give up to 10 times the service of conventional clothing in corrosive environments.

Description: Ply Garb safety and protective clothing is sewn with chemically resistant thread, with double-needle lock-stitched seams, which cannot ravel or run. Garments are washable, non-shrinking, and non-absorbant. They may be easily decontaminated.

Synthetic protective garments are reported to give up to 10 times service of conventional clothing in corrosive environments

Possessing exceptional abrasion resistance, garments may be laundered repeatedly without showing wear. Coveralls, shop coats, or two-piece uniforms, in natural or gray colors are available.

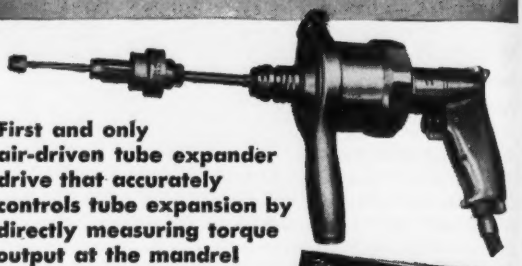
Garments to meet special job requirements are also available.

(Ply Garb is manufactured by Milburn Company, 3246 E. Woodbridge, Detroit 7, Mich.)

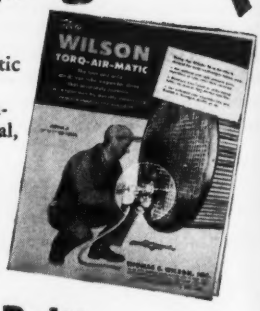
Check 3153 opposite last page.

For Expanding Heat Exchanger Tubes

NEW WILSON Torq-Air-Matic



First and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel



Only the Wilson Torq-Air-Matic offers all these features: air driven, automatic trip-off, completely integrated, non-electrical, non-frictional, calibrated in ft lbs torque, lightweight, simply adjusted.

Send for your copy of Wilson Bulletin 55.

Wilson Heavy-Duty Air Driven Cleaners

offer quick way to clean fouled heat exchanger tubes

Wilson Tube Cutter

easy to use, does fast job, a fine, reasonably priced tool

Representatives in principal cities
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WILSON TW-868

TUBE CLEANERS • TUBE EXPANDERS

Check 3154 opposite last page.

Package filter at Shell Chemical's butadiene plant serves dual purpose. Removing oil and emulsified matter from waste steam condensate unit . . .

provides clean makeup water and cuts stream pollution

JAMES B. MACKIE, Project Engineer
Shell Chemical Corporation

Problem: Because of increased production, 600 gpm of additional feed water were required for steam-generating facilities of Shell Chemical Corporation's Torrance, California, butadiene plant. Existing water-treating facilities were operating at capacity. Either the water-treating plant would have to be expanded, or some other source of make-up water would have to be found.

Solution: Engineers decided to make use of a waste stream of steam condensate which, up to this time, had been dumped into an interplant sewer. The condensate contained 40 ppm of oil, and was at a temperature of 130°F.

An economic evaluation showed that less expense would be required to install a filtering unit of 600-gpm capacity than to install water-treating facilities of similar capacity. Operating costs of filter were also calculated to be lower.

Company installed a "package" filter unit for the job. All component parts including filter, pre-coat tank, slurry tank, pumps, etc., are mounted on skid. Only condensate lines, makeup water, and electrical connections had to be connected in the field.

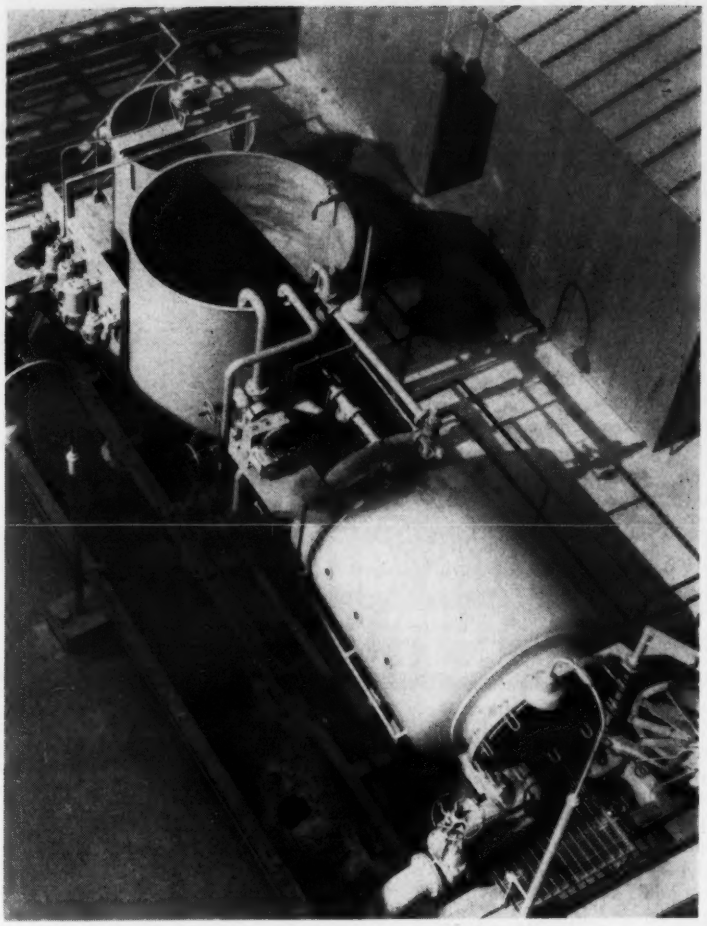
Filter is a horizontal cone-shaped vessel. Design includes sump space large enough to hold more than total volume of accumulated cake. This eliminates need for filter leaves to remain in sludge during cleaning cycle. It also permits operator to enter unit and inspect leaves easily.

Results: Filter supplies additional 600 gpm of feed water without difficulty — removing all oil and emulsified matter. Average filter cycle is 84 hours. Operation is smooth and simple, only one man being required part time. All operating controls are conveniently centralized for ease of operation.

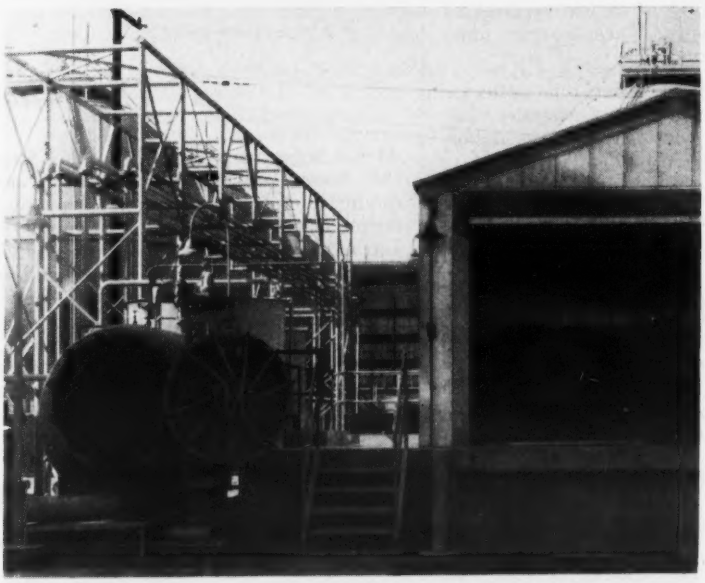
Filtering waste stream of condensate also helped Shell alleviate a waste disposal problem. Their plant is limited by law to amount of foreign material that can be present in effluent stream. Removing oil from condensate waste stream cuts down total oil content of overall effluent.

(Model 600 Roto-Jet filter is product of Hercules Filter Corporation, 173 Ethyl Avenue, Hawthorne, New Jersey.)

Check 3155 opposite last page.



Compact unit is mounted on skid for quick hook-up in the field



Filter is mounted next to prefabricated filter-aid storage building. Note quick-opening door on filter

Compact mist separator is built in a pipe

Oversize dropper pipe contains pre-separator, filter

Uses: Separating mist and fog from air streams.

Features: Mist collector uses conventional dropper pipe not only as a connection between source of mist and the blower, but also as enclosure for filter and pre-separator. Collector is designed for overhead installation, resulting in savings in floor space.

Description: Pipe-type collector, known as Mistender, uses a slightly larger-than-usual pipe to enclose a filter that is especially adapted for separating mist from the air stream and returning it to the source as reusable condensate.

Pre-separator causes most of mist as well as solids to "throw-out" and also be removed as condensate through contact with inside surface of pipe. A considerable volume of solids, fog, and mist is removed in this way, and never touches filter, thereby prolonging filter's life.

Pipe with its filter may be removed entirely, or simply swung out to horizontal on safety chain support while filter cartridge is pulled out for replacement. Cleaned air can either be returned to working area or exhausted outdoors. Various size units are available.

(Mistender pipe-type collector is product of Dustender Co., 3530 Pontiac Road, Ann Arbor, Michigan.)

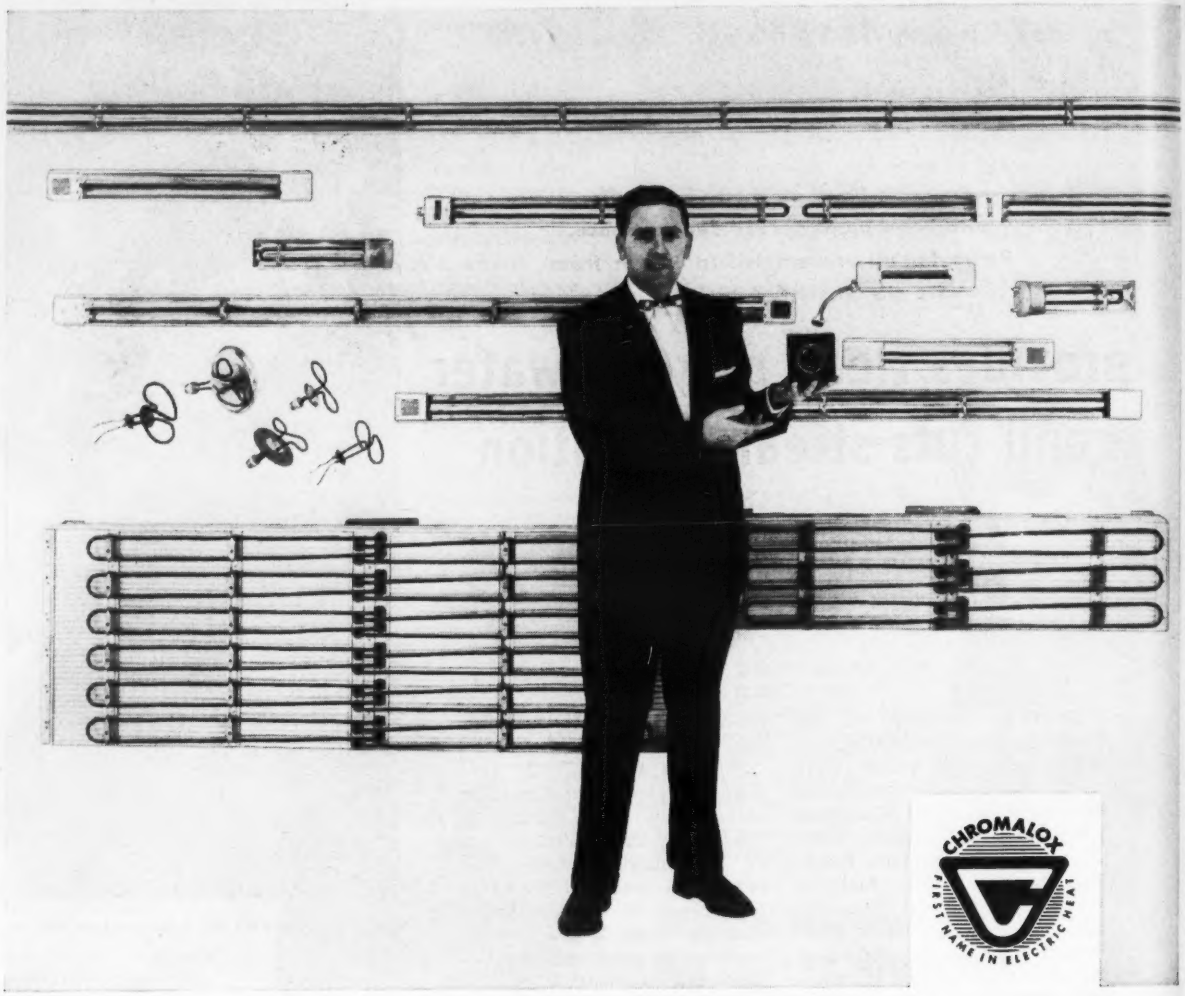
Check 3156 opposite last page.

Aluminum tube dryers designed for strength and long wear

Considerable savings realized from all-welded construction

All-welded construction of two aluminum steam-tube dryers installed in low-pressure polyethylene plant of Polymer Chemicals Div., W. R. Grace & Co., Baton Rouge, La., has resulted in reduced

New heating problem? Old production headache? Rx: Far-Infrared



Call the Chromalox man for the **ANSWERS**

At his fingertips, your Chromalox Representative has the answer to production delays, irregular product quality and other common problems caused by complex, outmoded heat sources. Chromalox Electric Far-Infrared radiation can be simply and precisely controlled over largest work areas, and is absorbed uniformly by practically all colors—even optically transparent materials.

With this fast, uniformly distributed heat, generated right at the job site, there is no need for stand-by heat or leaking lines. No smoke, fumes or flames. No glare. It's cooler and cleaner for your workers, too. Chromalox Far-Infrared elements are self-cleaning. Maintenance costs are minimum, as the all-metal heaters are practically indestructable—have no moving parts.

Get the best answers to all your heating problems. For assistance on new installations, or on improving an existing system, call or write your Chromalox Sales Engineering Representative. Standard heaters, to fit most jobs, are ready for immediate shipment from the world's largest stock. What's more, your Chromalox Representative offers factory design-engineering service for special applications. He has the electrical answer that's fast, clean, safe, accurate and economical.

C-2122A

CHROMALOX Electric Heat

Edwin L. Wiegand Company

7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania • CHurchill 2-6400

Check 3157 opposite last page.

Call Chromalox

for the man with the
ELECTRICAL ANSWERS
to your heating problems

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Woessner-McKnight Co.
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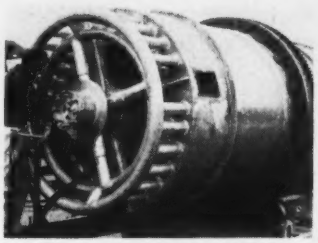


Dryer features all-welded aluminum construction

equipment costs. With exception of tires, driving gears, trunnion roll assemblies, and bed frames, units are constructed entirely of aluminum. Stainless steel pads separate dissimilar metals to prevent electrolytic corrosion.

All-welded construction of shell, hoods, steam-tube system, and manifolding was designed to provide greater strength and longer equipment life—allowing for high coefficient of expansion of aluminum. Double seals for all connections between shell and hoods maintain tight seal inside dryer. Steam is supplied through floating-type rotary joint.

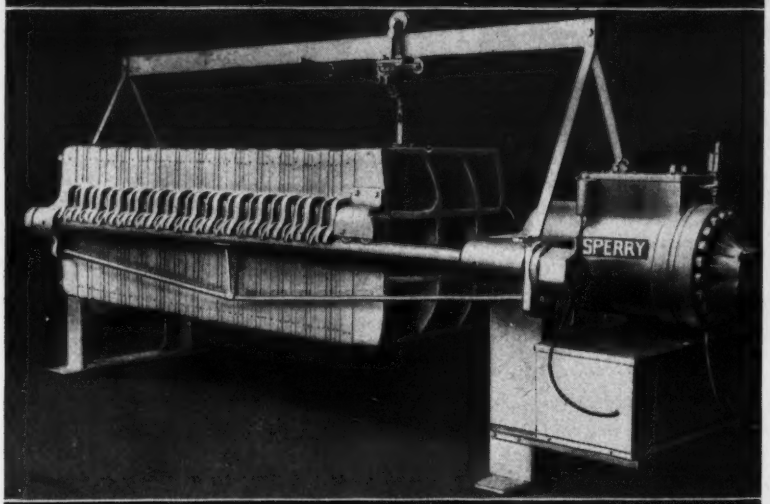
(Dryers were fabricated by Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58, California.)

Check 3158 opposite last page.

(Aluminum tubes were extruded by Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.)

Check 3159 opposite last page.

LOW DOWNTIME



with a plate and frame SPERRY FILTER PRESS

If your present filter system is inadequate to meet increased production demands . . . if excessive shutdowns, cleaning and manpower problems are dragging out your filter cycle so as to slow down your production cycle — now is the time to investigate all the advantages of a plate and frame filter press — as modernized and custom engineered to your particular application by D. R. Sperry & Company.

Through extreme versatility of design, a Sperry Filter Press can simplify the most complex filtration requirements. Varying batch sizes . . . incompatible products . . . cake removal . . . and constant cleaning cease to be problems. Instead — the cycle is reduced . . . filtering area and pressures are increased . . . downtime losses are reduced to a minimum . . . and with labor-saving automatic closing attachments and plate shifting devices, complete control is reduced to a one man operation.

Sperry Filter Presses are available in a design and capacity to handle any filterable mixture and any filter material . . . with center, side or corner feed; open or closed delivery; high or low temperature control; and your choice of labor saving devices.

FOR A LOW-COST ANSWER TO YOUR FILTRATION PROBLEMS, SEE THIS SPERRY CATALOG . . .
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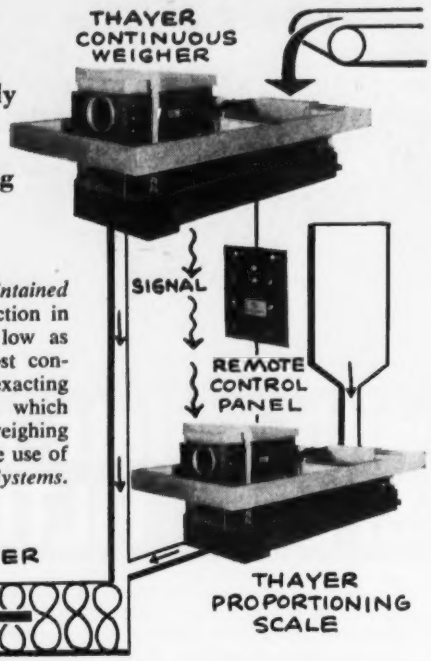
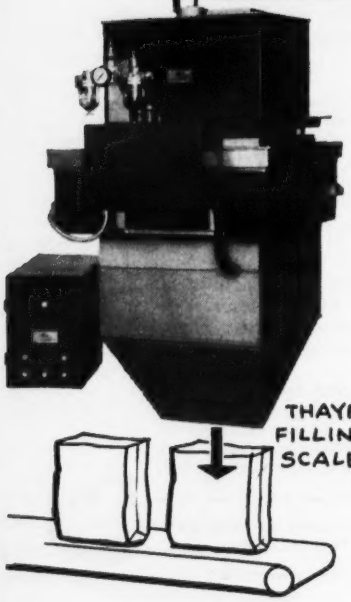
Check 3160 opposite last page.

CONTINUOUS FORMULATING with accuracy of ± ½%

***Lifetime accuracy* of unique Thayer Plate Leverage System safely permits complete AUTOWEIGHTION* from basic formulating to packaging.**



The high degree of accuracy *maintained* by *Thayer Scales* and the reduction in headroom requirements to as low as two feet, now provides low cost continuous formulating for many exacting processes. Formulation control which previously required batch weighing may now be accomplished by the use of *Thayer Continuous Weighing Systems.*



Wide Proportional Ranges

Proportionately small but highly critical ingredients (such as dyes, solids or liquids) can be accurately controlled. Proportioning is based upon the rate of the main product stream by using a *Thayer Continuous Weigher* to send an electrical or air signal to a *Thayer Constant Weighing Proportioning Scale.* This scale meters-out the additive material at a relative rate based upon the variable rate of the main stream.

Exclusive Leverage System Outperforms Other Scales

An extremely high degree of reliability is maintained through the exclusive use of the *Thayer Plate Leverage System* which is ***guaranteed accurate for the life of the scale.*** This unique scale has no knife-edge pivots to wear down and is not affected by dust, dirt, vibration or shocks.

Additional Technical Information Available

Send for our complete literature on Thayer Processing Scales.

THE Thayer SCALE

***THE THAYER SYSTEM OF PROCESS CONTROL BY WEIGHT**

AUTOWEIGHTION

THE THAYER SCALE CORP., 6 Thayer Park, Pembroke, Mass.

Check 3161 opposite last page.

Stops bubble formation in molded polyester

Degassing equipment removes air, gas from liquid resin

Uses: Degassing polyester resin on a commercial scale.

Features: Equipment provides practical method for removing dissolved and entrapped air from resin, thus alleviating serious problem encountered in molding reinforced polyesters.

Degassing resin before pour restores almost the full air-dissolving capacity of the resin, thus enabling resin to dissolve bubbles displaced from mat, and minimizing voids, pits, and surface imperfections in the final molded product.

Description: Degassing equipment consists of 60-gal working capacity kettle, 36″ diam and 30″ high. Unit has 16″ manhole, illuminated sight glass, manometer, dial vacuum gage, and vacuum break.

Vaccum is produced by 1-hp vacuum pump. Operating pressure is maintained at 50mm Hg absolute, or higher, by adjustable vacuum regulator. System is also furnished with cyclonic-type resin trap, 12″ diam and 18″ high, jacketed for heating or cooling. Dual-impeller agitator can also be furnished for kettle, if desired.

(Resin degassing equipment is product of Hull Corporation, Hatboro, Pa.)

Check 3162 opposite last page.

Discusses heat transfer

Suggestion that engineers approach problems of heat transfer without limiting their thinking to specific kinds of equipment is presented in four-page bulletin. Literature points out advantages that can be gained by considering both shell-and-tube heat exchangers and cast iron cooling sections. Form HT-24 — Heat Transfer Div., National-US Radiator Corp., 342 Madison Ave., New York 17, N. Y.

Check 3163 opposite last page.

PF FLEXIBLE TUBING *made from* **TEFLON*** *does this important job*

PF flexible tubing of Teflon* is being used to connect deionized water to a lead pot in the application shown here. This tubing material was chosen for 4 important reasons:

1. Its translucency shows fluid flow
2. Its flexibility allows easy installation
3. The high service temperature of Teflon* resists the high heat near the lead pot
4. The purity of Teflon* prevents the contamination of the deionized water

Standard stainless steel fittings make the assembly to standard equipment easy and PF flexible tubing of Teflon* is easily and economically taped into position.

Write, wire or call for complete details on the unique physical properties of PF flexible or spaghetti tubing that will solve your difficult application problems.

PENNSYLVANIA FLUOROCARBON CO., INC.
1115 NORTH 38th STREET
PHILADELPHIA 4, PA.
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PHOTO COURTESY OF ATLANTIC REFINING

* **TEFLON** DuPont trade name for Tetrafluoroethylene resin

Check 3164 opposite last page.

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *WELCOME* your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING others will have the opportunity of hearing your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 12 in this issue.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

For more information on product at right, specify 3165 see information request blank opposite last page.

New Dimension for Product Control...

TWINS do the Pumping

in New Gaulin Twin-Lobe® Rotary Positive Displacement Pump*

Twin-Lobe is a radically different pump design that brings exceptional efficiency to positive displacement pumping.

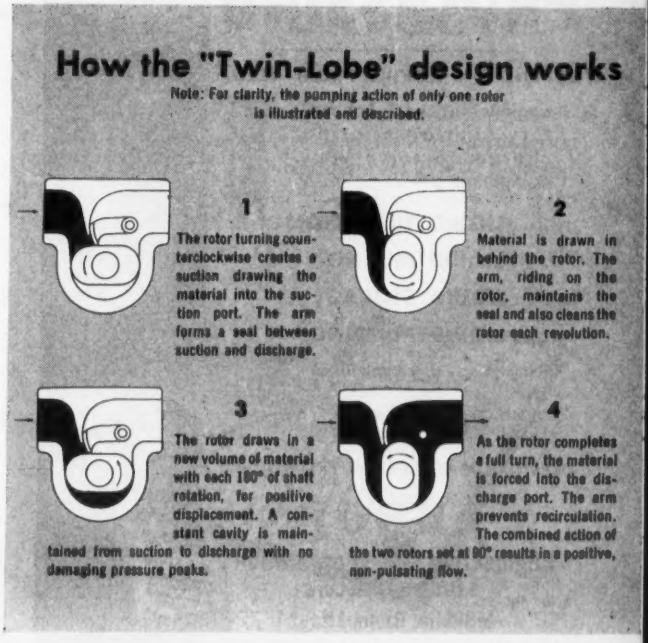
Check these exclusive advantages . . .

- Simplified design and construction, only three moving parts.
- High efficiency. Size for size the Gaulin "*Twin-Lobe*" delivers larger volume, requires less horsepower, pumps higher volume at low speed.
- Smooth action, metering accuracy. Non-pulsating, non-foaming action, no agitation or churning.
- No gears or meshing teeth to chew or bruise foods, plastics or chemicals.

Ask for New Bulletin!

TLP-57 and GTA will help you put this pump to work — write or call, today.

*Pat. Applied For


How the "Twin-Lobe" design works
Note: For clarity, the pumping action of only one rotor is illustrated and described.
1
The rotor turning counterclockwise creates a suction drawing the material into the suction port. The arm forms a seal between suction and discharge.
2
Material is drawn in behind the rotor. The arm, riding on the rotor, maintains the seal and also cleans the rotor each revolution.
3
The rotor draws in a new volume of material with each 180° of shaft rotation, for positive displacement. A constant cavity is maintained from suction to discharge with no damaging pressure peaks.
4
As the rotor completes a full turn, the material is forced into the discharge port. The arm prevents recirculation. The combined action of the two rotors set at 90° results in a positive, non-pulsating flow.

Gaulin
MANTON Gaulin

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World's largest manufacturers of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

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Craftsmen in steel plate and alloys up to 1"

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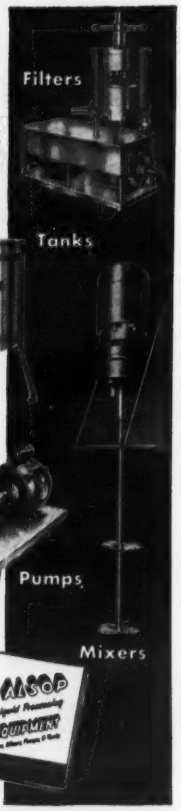
LIQUID PROCESSING



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ALSOP Engineering Corporation
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Milldale, Connecticut

Send for analysis forms and literature.

Check 3167 opposite last page.

New concept in glass-lined reactors

Sphere-shaped unit . . .

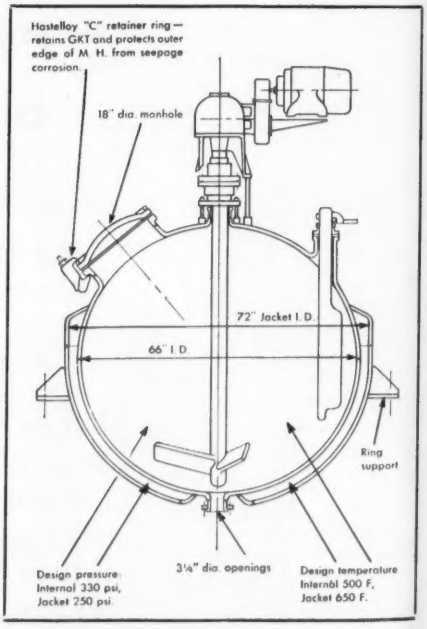
- **Withstands 330-psi internal pressure**
- **Gives better heat transfer**
- **Permits higher vaporization rates**

Uses: Conducting various chemical reactions at pressures up to 330 psi.

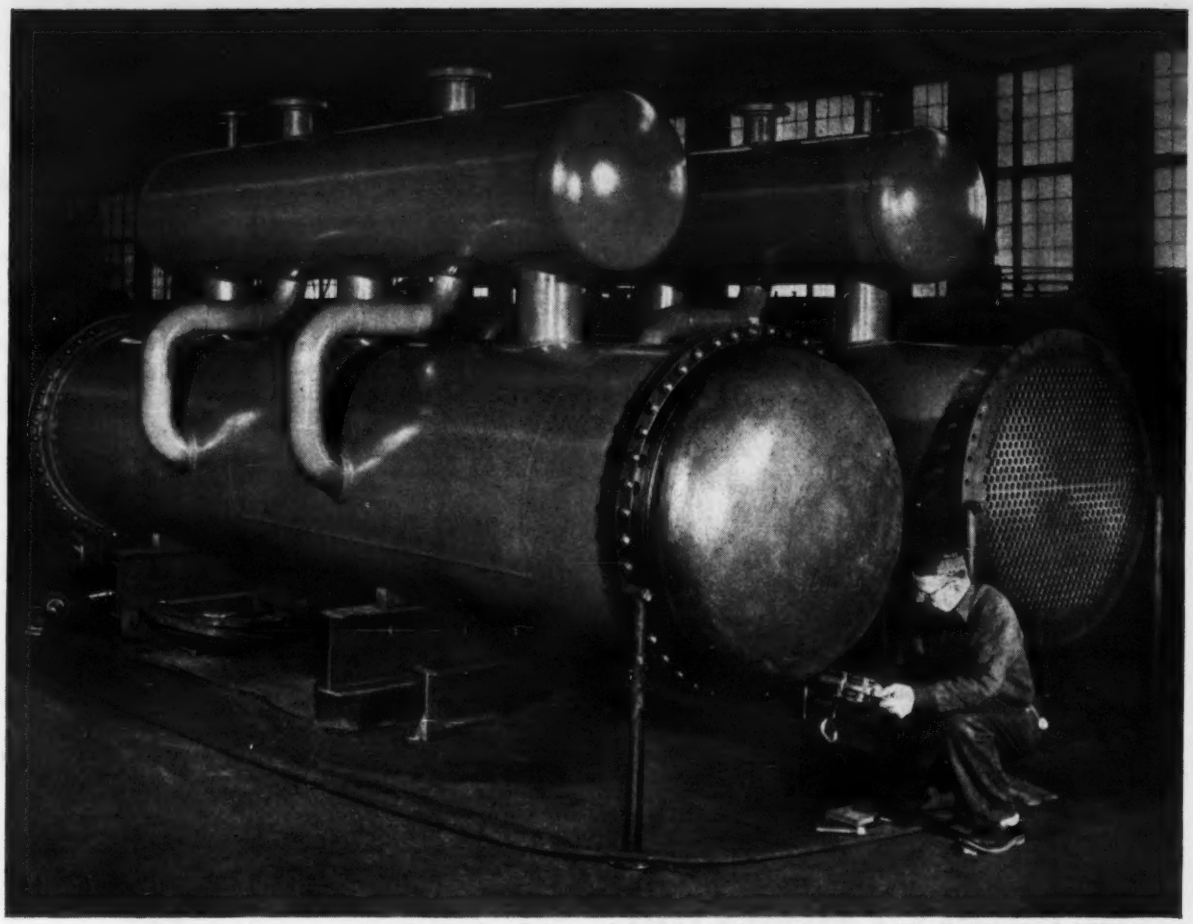
Features: Reactor's spherical design permits unit to be operated at higher internal pressures than heretofore possible in production-size glass-lined reactors.

Use of sphere shape also permits thinnest wall possible for containment of any given amount of liquid under pressure. Since heat transfer area is about same as in conventional reactor, the thinner shell plus high liquid velocity along wall improves overall heat transfer coefficient.

Large liquid surface area permits higher vaporization rates while reducing tendency to foam. Since overall agitator shaft length is considerably shorter than that in a conventional reactor of same volume, drive maintenance and bending moment on the shaft is also cut.


Hastelloy "C" retainer ring—retains GKT and protects outer edge of M. H. from seepage corrosion.
18" dia. manhole
72" Jacket I.D.
66" I.D.
Ring support
Design pressure: Internal 330 psi, Jacket 250 psi.
3¼" dia. openings
Design temperature Internal 500 F, Jacket 650 F.

Sphere shape permits thinnest wall possible to contain a given amount of liquid under pressure



◀ Spherical glass-lined reactor is designed for internal pressures of 330 psi, jacket pressure of 250 psi

Description: The sphere-shaped 500-gal capacity reactor is a new concept in production-size glass-lined chemical processing equipment. Growing demand for glass-lined reactors with higher pressures — and the anticipation for even greater pressures in periods ahead — resulted in the development of this unit.

Unit is designed for internal pressures of 330 psi, and jacket pressure of 250 psi. Design temperature is rated at 500°F at liner shell, with jacket temperature at 650°F. Glass lining consists of manufacturer's acid-alkali chemical-resistant glass #338. Reactor is constructed under ASME Code, Section VIII, 1956 edition.

Reactor's liner is made of Grade B SA285 steel. Jacket is constructed of Grade A SA212 steel. Unit has only one main seam, resulting in minimum welded area. Manhole ring is made of Hastelloy "C". Rotary mechanical seal on agitator minimizes leakage and contamination problems encountered with conventional packed stuffing boxes.

(Spherical glass-lined reactor was developed by Glascote Products, Inc., subsidiary, A. O. Smith Corp., 20900 St. Clair Avenue, Cleveland 17, Ohio.)

Check 3168 opposite last page.

Operator can watch action in demineralizer columns of cast acrylic

Uses: Purifying water at rates up to 100 gph.

Features: Cast acrylic columns for both filter column and ion exchange column enable operator to see action at all times. Water produced has less than ½ ppm impurity.

Description: Demineralizer operates on mixed-bed ion exchange principles. Unit is shipped ready for use upon simple connection to plant's service lines. Exchange capac-

Single source supply—B&W tubes, fittings and flanges expedite production of this ethylene glycol chiller.

One Call Will Do It All . . . Specify Tubular Products From B&W

In one recent installation, the tubes, welding fittings and flanges of two ethylene glycol chillers were all supplied by B&W. The reason for this one-source buying? The fact that designers, engineers and purchasing agents alike know that B&W Tubular Products will do the best job possible . . . efficiently, dependably and economically. One-source buying insures integrated delivery and expedited production in your shop.

And besides the advantages inherent in a centralized source of supply, B&W offers another outstanding value in its Tubular Products. Tubes are tailored to specific jobs. The result—when you specify B&W, you get what you order.

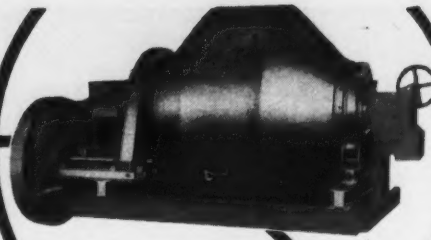
One simple call to B&W can bring you these benefits. As part of the same call and the same service, delivery can be coordinated on matched pipe, fittings and flanges to meet your specific requirements. Contact Mr. Tubes at your nearest B&W Tubular Products Division District Sales Office. He can help you get the integrated system that you desire. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7064-PG5

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy, and stainless steels

Check 3169 opposite last page.

MUNSON



Here's why more and more MUNSONS are doing the important mixing jobs

ROTARY BATCH MIXER

• Munson Mixers will quickly blend various chemical compounds into a homogeneous, accurate mixture, no reduction in particle sizes • They blend powders and granules • Spray pipes may be installed to spray liquids on dust and granular materials • Internal vent pipe to expel toxic fumes • Drum may be heated or cooled • Granular fertilizers can be coated with insecticide dust • Will blend chemicals, fertilizers, insecticides, herbicides, antibiotics, and many other materials • Available in several models • Low horsepower • 20 to 250 cu. ft. mixing capacity

TELL US YOUR MIXING PROBLEMS . . . write or phone for the complete story on Munson Rotary Batch Mixers.

MUNSON MILL MACHINERY COMPANY
Dept. P-158 210 Seward Ave., Utica, N.Y.

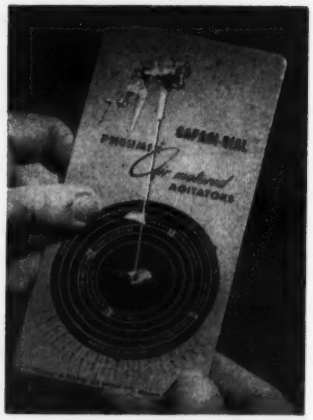
Check 3170 opposite last page.

NEW POCKET CALCULATOR

For Liquid Batch Mixing

CAPACI-DIAL for PNEUMIX AGITATORS

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



The attached coupon will get you one without obligation.

ECLIPSE AIR BRUSH CO.
308 Park Ave. Newark 7, N.J.

Please send free CAPACI-DIAL to:

Name .....

Company .....

Address .....

Check 3171 opposite last page.

ity of resin charge is 18,000 grains. Unit's overall dimensions are 15x15x86".

Piping, valves, screens, and eductors are made of corrosion-resistant materials. They are either of red brass or Uscolite plastic construction. Controls for fully automatic operation are optional.

(Mono-Column demineralizer is product of Penfield Manufacturing Company, 19 High School Ave., Meriden, Connecticut.)

Check 3172 opposite last page.

Paying for dust?

Publication explains economies of dust control with manufacturer's dust collectors through reduced capital expenditure, operating time, and machine operating costs, and increased employee efficiency. On-the-job photographs and application stories are included. "How much Are You Paying For Dust?" — Dept. KP-5, Torit Manufacturing Co., Walnut & Exchange Sts., St. Paul, Minn.

Check 3173 opposite last page.

Solids pumped continuously into pressure vessels by feeder

Converts batch processes into continuous operations

Uses: Feeding solids continuously into, or removing them from, pressurized vessels at pressures up to 120 psi. Pilot plant studies have shown that feeder can be used successfully with wide variety of granular materials. About 200 commercial units are now being used in the food field in continuous pressure cooking operations.

Features: Feeder makes it possible to convert many batch processes to continuous. One revolution of feeder will deliver 1.5 cu ft of solids to or from the pressure vessel. Particle size ranges from ⅛ up to 5".

Description: Known as the

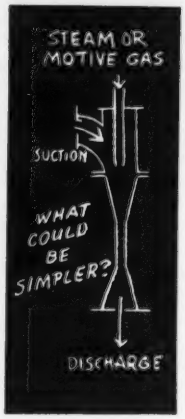
To page 171

how to move

GASES

with NO MOVING PARTS

In I-R Ejectors, nothing moves but the motive and suction gases



As simple and sturdy as a piece of pipe, the I-R Ejector offers real *economy* and *dependability* for a wide range of applications.

They can be used to create vacuum or increase pressure, and to mix gases.

Your nearest Ingersoll-Rand branch office or representative will be glad to give you complete information. — Or write today for a copy of Bulletin 9013-A.

4-658

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Check 3174 opposite last page.

Technicians Prefer *Despatch* LABORATORY OVENS

An exacting testing and production oven that provides very close heat uniformity. Built-in indicating temperature controls. Emphasis has been on heavy construction . . . even heat distribution . . . capacity loads at high speed . . . ability to "stand the gaff"—even under continuous 24-hour-a-day usage. Six sizes and types are available for the endless variety of heating, drying, baking and testing processes. Get Bulletin No. 107.

ovens for all purposes

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Established in 1902
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Check 3175 opposite last page.

WOLVERINE
TUBE
Items of Interest to the Processing Industry

PUBLISHED BY WOLVERINE TUBE DIVISION

HOW TO LICK 3 PROBLEMS WITH 1 CONDENSER TUBE

BY ERNEST DODD

Solving three major heat transfer problems with one product is the neat trick performed recently by CALIFORNIA STEEL PRODUCTS, Division of Yuba Consolidated Industries, Inc., when fabricating a battery of six U-bend shell and tube heat exchangers for one of its West Coast customers. The units were to be used in jacket water-crude oil cooler service.

The problems: reduce unit size, slash unit costs, and increase unit service life. The product involved was electric-welded steel Wolverine Trufin® Type S/T condenser tubing in U-bend form. Here's how—and why—this product of Wolverine Tubemanship was able to help CALSTEEL accomplish its objectives.

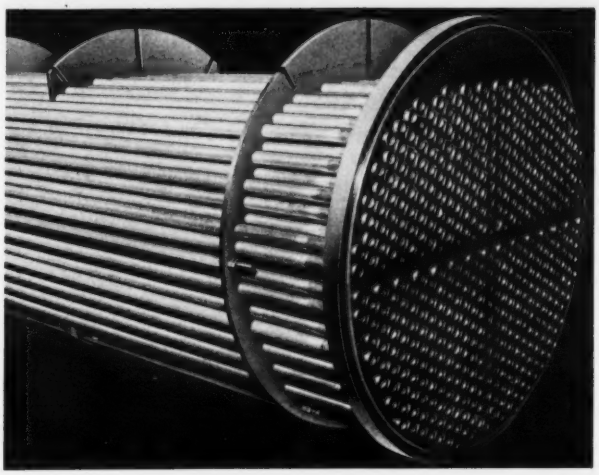
Because it is an extended surface tube with fins actually extruded from the tube wall, Trufin Type S/T has approximately 2½ times more heat transfer surface than does plain tube. It packs more heat transfer surface into a given area—permits the design of smaller and more powerful heat exchangers.

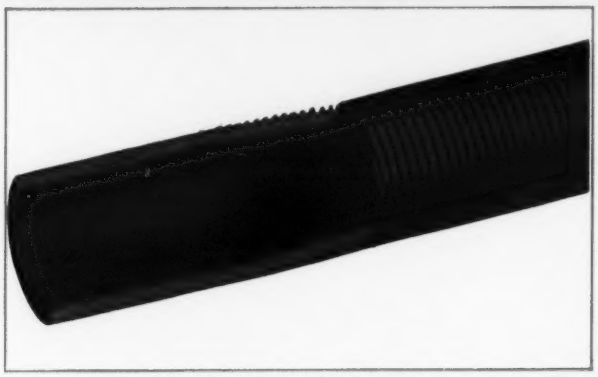
This greater surface area also means that Type S/T requires fewer tubes to handle equivalent heat duty. This means a substantial savings in direct tube costs. Fewer tubes also permit the use of smaller shells, heads and baffles with a consequent saving in material costs. This in turn brings a reduction in labor costs because of fewer rolling in operations.

Although operation of crude oil coolers is regarded as dirty service, similar applications where Trufin Type S/T electric-welded condenser tubes have been used have proven conclusively that Trufin tubed units stay on stream considerably longer than plain tube exchangers. Designers have discovered that the configuration of Trufin's extended surface is less conducive to scale build up than that of plain tube. Scaling tends to follow the contour of the fins, forming in many cases, an extended projection of the fin that contributes to self shedding. This assures reduced maintenance and increased on stream time.

In addition, CALSTEEL also helped itself to still greater savings and convenience when it specified Trufin Type S/T in U-bend form.

Wolverine pre-fabricates its U-bend condenser tubes to customer specifications—ships them in the exact order of their installation in disposable pallets. All the user has to do is insert them directly into the unit. This reduces inventory, saves floor space and cuts downtime.





Your company, too, can realize similar savings in money, time and convenience by specifying Wolverine Trufin Type S/T condenser tube. Next time you retube existing equipment or consider the design of new units, be sure to specify *Trufin*.

SEND FOR FREE BOOK

Wolverine's Trufin Catalog is filled from cover to cover with valuable information concerning integrally finned condenser tube. Processing engineers and design engineers alike will find here one of the most comprehensive sources for such finned tube data as types, sizes, alloys, end finishings, fabrication techniques, standards, and applications. Write for this valuable book today!

PUBLISHED BY WOLVERINE TUBE DIVISION

As Near as your Telephone

For the convenience of its customers Wolverine Tube maintains sales offices in the cities listed below. You'll find the addresses and telephone numbers listed in the yellow pages of your telephone directory. For complete information about Wolverine Trufin or other Wolverine products just call the sales office nearest you:

ALBUQUERQUE, NEW MEXICO
ATLANTA, GEORGIA
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BUY WOLVERINE TUBE—IT'S MADE IN AMERICA!

CHECK THESE APPLICATIONS

Listed below are a few of the many applications where Wolverine Trufin is providing new concepts of economical heat transfer operation. Look them over and we're sure you'll find operations similar to your own.

Remember that this versatile condenser tube is available in a wide range of sizes, types and alloys in copper, aluminum and electric welded steel. It is also available in low fin form (Type S/T) for shell and tube applications and with high fins (Types H/A, H/R, L/C, I/L) for air cooled operations.

- **Asphalt heater**
- **Reboiler**
- **Atmospheric section**
- **Light hydrocarbon condensing**
- **After coolers**
- **Heater**
- **Nitrogen after coolers**
- **Propane condensing**
- **Debutanizer condenser**
- **Ammonia condensing**
- **Methylchloride condensing**
- **Phenol cooler**
- **Ethyl chloride condensing**
- **Butalene condensing**
- **Freon condensing**
- **Toluene reboiler**
- **Iso Butane condensing**
- **Coolers**
- **Oil to Oil**
- **Steam to steam**
- **Oil coolers**
- **Gas coolers**
- **Inter-cooler**
- **Kero-coolers**
- **Oil heater**
- **Tank suction heaters**
- **Stripper overhead condenser**
- **Amine reboiler**
- **Debutanizer bottoms cooler**
- **Alcohol cooler**
- **Lube oil cooler**
- **Lean oil-rich oil exchanger**

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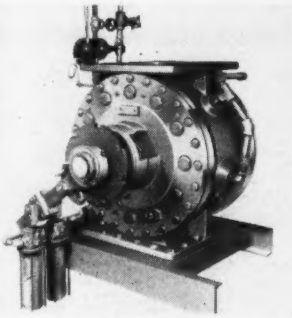
Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA.
SALES OFFICES IN PRINCIPAL CITIES
EXPORT DEPARTMENT, 13 EAST 40TH STREET, NEW YORK 16, NEW YORK
Wolverine Trufin is available in Canada through the Unifin Tube Co., London, Ontario.

From page 170

Transol 120, feeder can convert batch or fixed-bed solids processes, to continuous high capacity production at pressures up to 120 psi, steam or gas, with operation temperatures to 350°F.



One revolution of feeder will deliver 1.5 cu ft of ⅛ to 5" solids to or from pressure vessels

Unit can be constructed of either steel or stainless steel. Feeders are manufactured and approved in accordance with ASME code specifications for unfired pressure vessels.

Feed and discharge apertures are 9½" square. Housing is 29" diam, and adapters are available to fit the square flange to round pipe flange.

Four accesses are provided in housing to relieve pressure, or to feed back-pressure to pockets returning to "suction" for economy of process gas. Discharge pressure may be gradually lowered through openings, or they may be sealed off for instantaneous pressure drop where the mechanical effect of the blast is desirable.

Manufacturer is equipped to conduct all phases of process and product development based on the continuous pressure vessel system.

(Transol 120 pressure feeder is development of Canning Machinery Division, Food Machinery and Chemical Corporation, PO Box 1120, San Jose, California.)

Check 3176 opposite last page.

For more information on product at left, specify 3177 . . . see information request blank opposite last page.

-320°F.

Now a complete line of BJ Pumps for Liquid Oxygen, Nitrogen and Methane!

BJ

BJ offers a complete line of dependable horizontal cyrogenic pumps with BJ Lo-Temp Mechanical Seals for pumping such liquids as oxygen, nitrogen and methane.

Designed to handle liquids at temperatures as low as minus 320° F. with capacities to 3500 gpm against total heads to 1600 feet, this dependable standard line of pumps answers all low temperature requirements of liquid oxygen, nitrogen, methane pump users.

Only Byron Jackson combines years of knowledge in the two areas vital to creating a fully dependable pump and seal for this service: (1) years of engineering and (2) unchallenged leadership in the development of mechanical seals to assure reliable stuffingbox operation. This means that now you can get—on standard order—pumps to answer any sub-zero liquid handling requirements.

See your local Byron Jackson Pumps office for details or write for "BJ Pumps for Liquids at Sub-zero Temperatures."

Send for this informative file . . .

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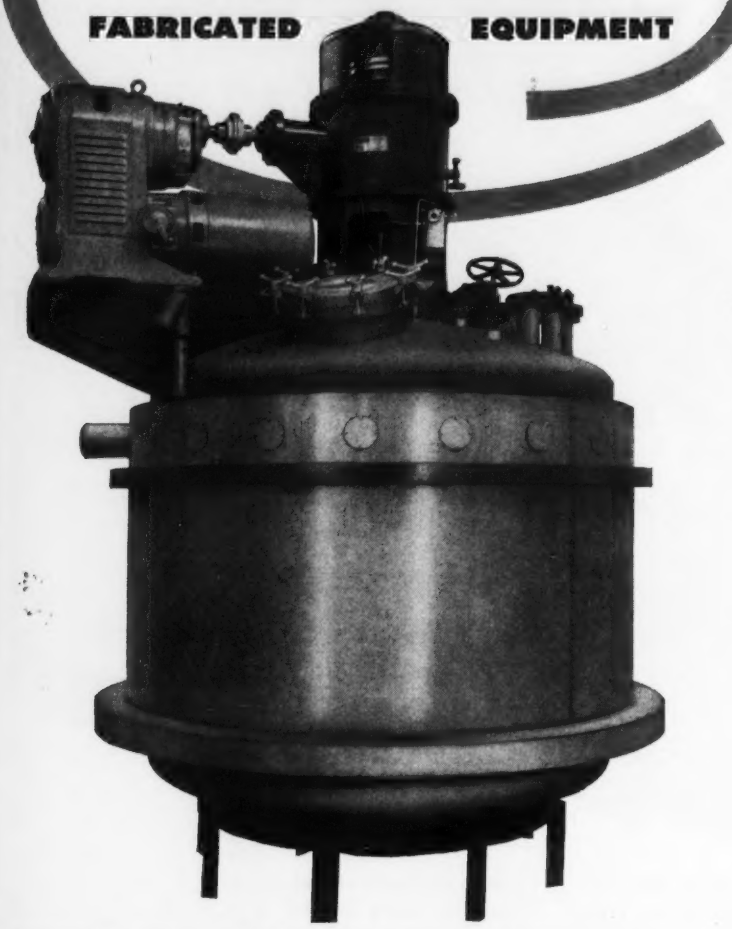
Check 3178 opposite last page.

PRODUCTS
THAT CREATE EXCITING ADVANCES IN THE PROCESS INDUSTRY USUALLY GET STARTED IN BRIGHTON FABRICATED EQUIPMENT



Brighton's fabricating skill is evident in the 2,000 gallon capacity set kettle, capable of producing synthetic resins, plastics, adhesives, varnishes and bodied oils of equal quality. It can also be used for many other synthetic products. This Brighton equipment was fabricated to specifications, and is now in an integral segment of a chemical plant operation.

Brighton's complete engineering department provides the technical information, our facilities deliver the products within the specified time. Send Brighton your problems. We're equipped to fabricate in every type of alloy metal. Write for a Catalogue.

BRIGHTON

METALSMITHS EST. 1914

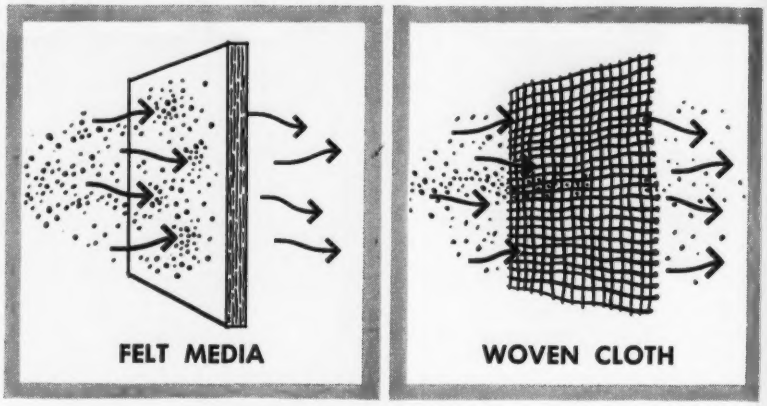
CORPORATION

820 STATE AVENUE · CINCINNATI 4, OHIO

Check 3179 opposite last page.

DAY

DUST CONTROL NEWS



Here's why felt filter media traps dust BETTER!

This magnified view of filter media makes it easy to see why felt is more efficient than woven cloth. With cloth, the average opening between thread strands is above 10 microns. Felt, however, is made up of closely matted fibres and the air travels a tortuous path between the thousands of individual fibres. For all practical purposes, the resistance of these media is the same. That's why felt filtering media (wool or synthetic) is used exclusively in *all* filters made by DAY.

Consider this important fact. What happens when these two media are cleaned? Woven cloth is cleaned by shaking, rapping or low velocity reverse air. In many cases woven cloth is overcleaned, permitting leakage until openings between strands are again plugged with dust. The overall performance is one of erratic back pressure and filtering efficiency. *With DAY filters the porosity of the felt media is maintained by automatic counter flow air. Back pressure doesn't vary and peak filtering efficiency is constantly maintained.*

Whether your problem is collecting and recovering valuable dust or controlling dangerous or obnoxious dust; write for our free bulletin "DUST FILTER FACTS." Read this bulletin carefully before you decide on *any* dust filter. It contains useful charts and air engineering data. It also contains more information about the many services and equipment available from DAY. Write toDAY for Bulletin F-75.

The DAY Company

SOLD in UNITED STATES by The DAY SALES Company 852 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by The DAY Company of Canada Limited P.O. Box 70 Y, Fort William, Ontario

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

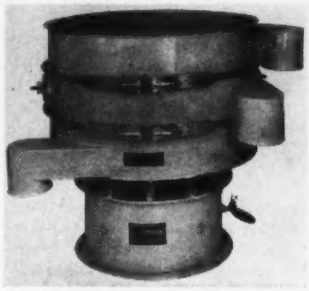
Check 3180 opposite last page.

Obtain two to four fractions with screen separator of 1, 2, or 3 decks

Constructed of carbon steel or stainless type 316

Uses: Screening wet or dry, coarse or fine materials, and in separating solids from liquid.

Features: Using a 1, 2, or 3-deck separator, two to four fractions can be obtained.



Vibrating screen separator is available in 1, 2, and 3-deck models

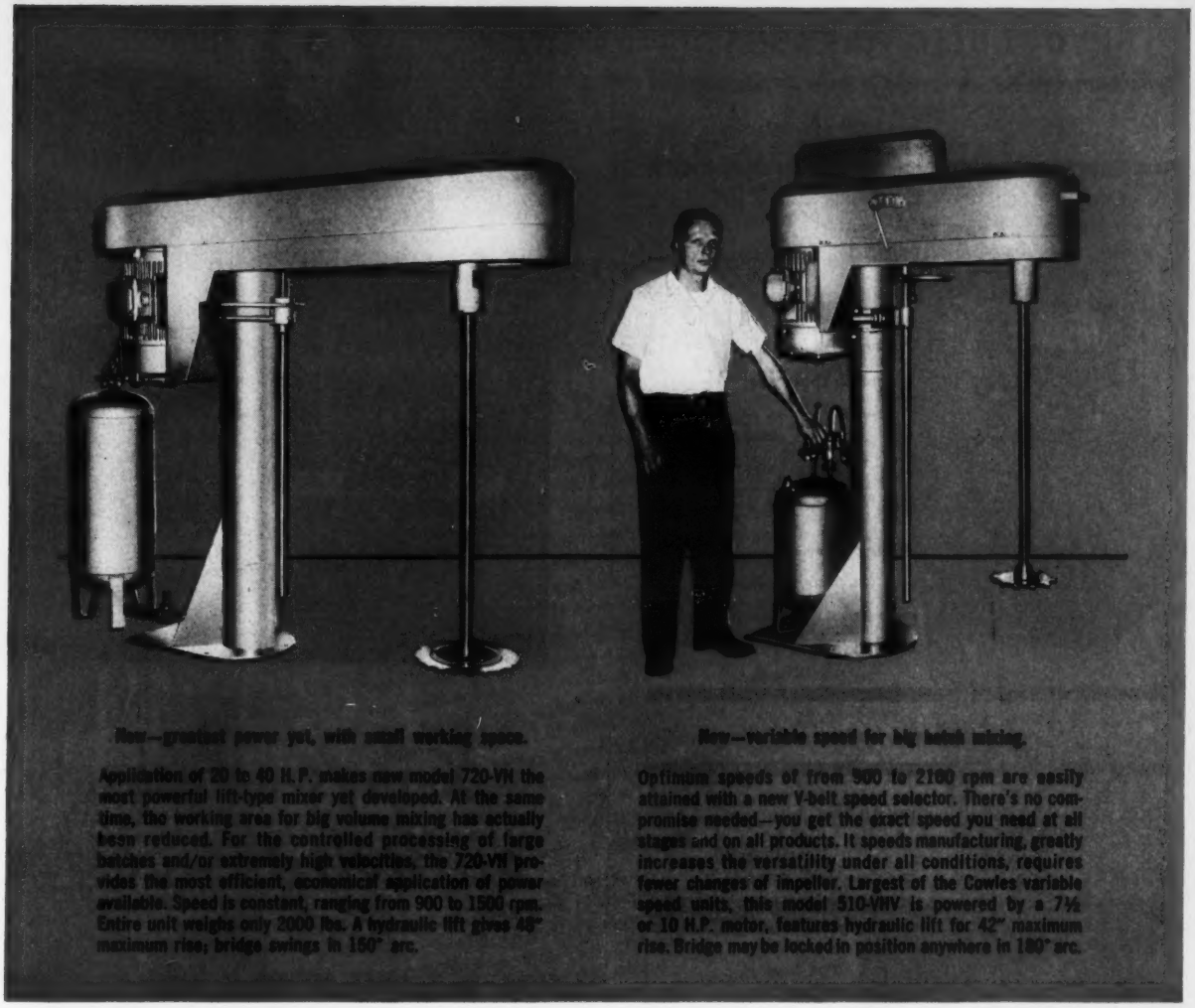
Description: Vibrating screen separators are available in 1, 2, and 3-deck models. Units have 30″ diam and are constructed of carbon steel or type 316 Stainless Steel. Totally enclosed 60-cycle, three-phase, 1200-rpm, ½-hp, 220/-440-volt motor is used.

(Vibrating screen separator is product of Southwestern Engineering Company, 4800 Santa Fe Ave., Los Angeles 58, California.)

Check 3182 opposite last page.

Petrochemical processing — See February CP

The monthly petrochemical section section, starting in CHEMICAL PROCESSING in February, will contain articles on the latest developments in petrochemical processing equipment as well as petrochemical processes themselves.



New—greatest power yet, with small working space.

Application of 20 to 40 H.P. makes new model 720-VH the most powerful lift-type mixer yet developed. At the same time, the working area for big volume mixing has actually been reduced. For the controlled processing of large batches and/or extremely high velocities, the 720-VH provides the most efficient, economical application of power available. Speed is constant, ranging from 900 to 1500 rpm. Entire unit weighs only 2000 lbs. A hydraulic lift gives 48" maximum rise; bridge swings in 150° arc.

New—variable speed for big batch mixing.

Optimum speeds of from 900 to 2100 rpm are easily attained with a new V-belt speed selector. There's no compromise needed—you get the exact speed you need at all stages and on all products. It speeds manufacturing, greatly increases the versatility under all conditions, requires fewer changes of impeller. Largest of the Cowles variable speed units, this model 510-VHV is powered by a 7½ or 10 H.P. motor, features hydraulic lift for 42" maximum rise. Bridge may be locked in position anywhere in 180° arc.

Cowles develops two new multi-phase* mixers for faster big-volume production

***What is Cowles "multi-phase" mixing?**

Cowles exclusive mixing principle is based on the unique action of the patented Cowles Impeller. Where ordinary mixers do a partial job by imparting random motion to particles in suspension, the Cowles takes material through several extra phases: Material is thrown off at 60 mph speed from impeller vanes. This creates violent action of the suspension against itself—a zone of "hydraulic attrition" in which particle is sheared and smashed against particle to accomplish truly ultimate dispersion. Direct action of the impeller is thus multiplied many times. At the same time, the entire batch is kept in "total motion", returning to the impeller in a controlled cycle. Result is a speed, thoroughness and predictability unmatched by other methods. Scientific details on request.

THE COWLES PRODUCTION RECORDS of up to 20 times faster ultimate dispersion have brought the inevitable result: user demands for ever larger and more versatile units. And here are the Cowles answers. They are proved for up to 2½ times the per-hour volume you may be used to. On any liquid-base mixing, dispersing, deagglomerating, homogenizing or emulsifying job, the Cowles promises not only greater speed and simplicity, but lower space, power and maintenance requirements.

The Cowles enjoys the fastest growing popularity in its field.

To find out how the most modern mixing methods can benefit your operation, let us prove the Cowles in your plant—at our risk! Write today on your letterhead for complete details.

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5716

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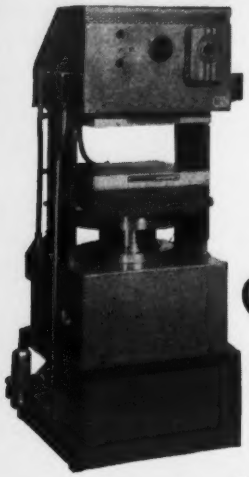
Representatives in principal cities
Convenient lease and time payment plans

Check 3183 opposite last page.

HYDRAULIC PRESSES

20 tons to 500 tons ram pressure



Platen area 8 to 24 inches
Motorized hydraulic system
Controlled platen temperatures to 600° F
Automatic time cycler
Customized to your requirements

PHI PRESS *formerly Preco*

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Pasadena Hydraulics, Inc., 1433 Lidcombe, El Monte, Calif.

Check 3184 opposite last page.

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Your best source for

Glass Capillary Tubing
Glass Tubing and Rod
Scientific Glassware
Glass Wool Fiber

Reliable since 1919

INFORMATION

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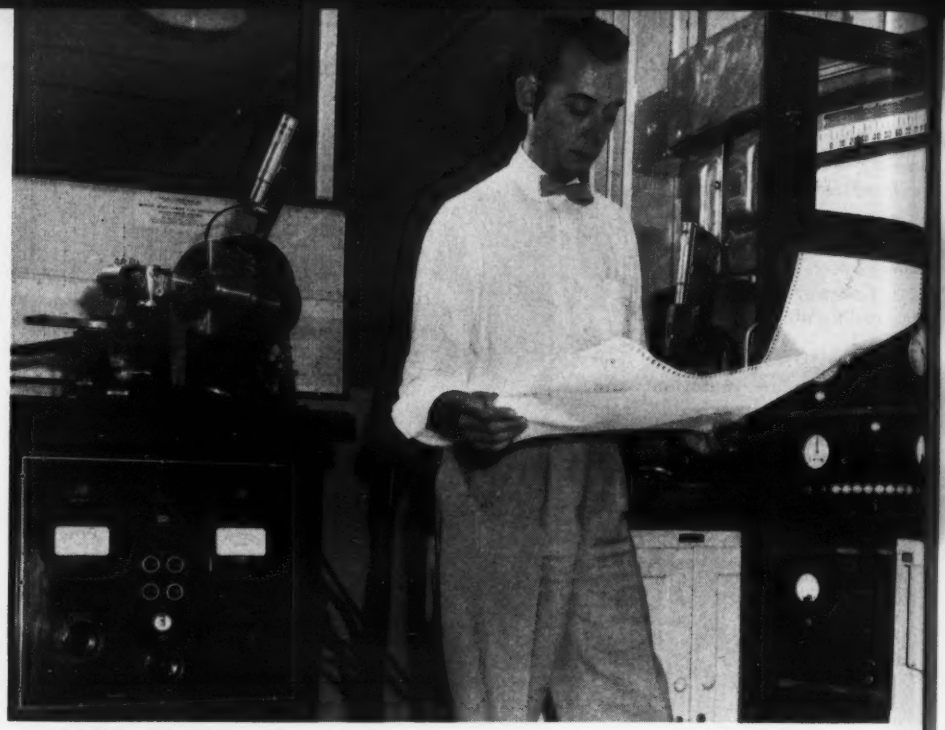
SEND _____
TO _____

Check 3185 opposite last page.



X-rays accurately determine *'difficult-to-analyze'* rare earths

Three groups at University of Washington also use X-ray techniques on clays, crystals, even nucleotides

OPERATING under generous research grants from industrial and government sponsors, three groups at the University of Washington in Seattle, Washington, are using X-ray analysis methods. Both X-ray spectrograph and diffraction techniques are being used to solve difficult problems in a dozen different fields.

Both are non-destructive analytical methods. In the X-ray spectrograph, induced secondary radiations provide quantitative information on percent of elements present regardless of whether they are free, in combination, or both. Results are recorded in a matter of minutes on a strip-chart. The diffraction technique requires an intense beam of X-radiation be directed upon a specimen. Secondary beams of the same radiation reflected by atomic structure of the material provide information on crystal geometry and structure. Diffraction patterns as recorded on a strip-chart are representative of either elements or compounds.

Identifies Rare Earths

Receiving two monazite sand specimens from a mining company, with a request for identification, the Ceramics Engineering Department was able to qualitatively analyze both samples in a very short time. In one sample, four of the nine elements present were determined to be rare earths. The second sample contained fourteen elements of which nine were rare earths.

Although accurate quantitative determinations require comparisons of unknowns with suitable standards, peak heights of the qualitative curves indicated the predominant elements in each sample.

Analyzes Clays

Studies have also identified minerals in clays, measured iron in chrome-iron ore, even investigated raw materials for fabricating artificial teeth and dental

Professor James I. Mueller, of the Ceramics Department at the University of Washington, examines X-ray analysis results on strip-chart. X-ray techniques provide identification as well as quantitative data — non-destructively

James Brathovde manipulates a linear-to-log converter and integrator constructed in the Chemistry Department. Instrument facilitates work on X-ray diffraction intensity data used in single crystal structure determinations

porcelains. Some investigations have concerned polymorphic phases of silicon and quantitative determinations of the glassy phase in ceramic bodies.

An interesting problem submitted to the Ceramics group concerned high-grade tungsten concentrates. Specifications required not more than 1% of certain impurities be present in the concentrate. Analyses by petrographic grain count were too inaccurate. Problem was to determine a method of analysis that would give the desired answers rapidly.

What was done? Three samples were analyzed by X-ray techniques. Specimen X was a concentrate of black material found in a high-grade ore, a calcium tungstate called scheelite. This was presumed to be one of the impurities, called ferberite, present in the ore. Second specimen was material remaining in scheelite after specimen X was removed. Specimen Z was a concentrate of ferberite assayed by conventional methods.

Tests were made with X-

WE HAVE SAVED $3,659.83 IN 6 MONTHS BY USING LIME GLASS INSTEAD OF HEAT RESISTANT GLASS ..."
says West Coast Research Director
In an unsolicited letter to Doerr Glass Company, Dr. Kenneth W. Crandell writes . . .
". . . Recently, an inventory was taken of our glassware stock; it was found that an excess of heat-resistant glassware was on hand and that it had not been used since it was purchased over a year ago. The matter was promptly taken up with the purchasing department. Very shortly a new policy was adopted concerning the purchasing of necessary glassware. This new policy has been in effect six months to this date, and it has been verified by purchasing records we have saved more than $3,659.83 without sacrificing the quality and accuracy of our work in any way whatsoever, by allowing lime glass to take the place of currently available heat-resistant glass.
"To some of the largest commercial and industrial research laboratories this saving may seem trivial. But, we have proven, to our own satisfaction, that we can do away with unnecessary glassware needs and use the net savings to buy additional equipment and supplies that could not be "squeezed" into our research budget last year due to their very high costs. . ."
You, too, can realize substantial savings if you begin today by making the Doerr "Two-Way" Test. Send for our new FACTS booklet right away.
"FACTS" BOOK TELLS THE ECONOMIC STORY.
FACTS
This 16-page, 2-color booklet explains in detail the economics involved in the purchase of laboratory glassware. Every buyer and user of lab glass should read this booklet thoroughly. If you haven't received your copy yet, send for it today. There's no obligation.
DOERR GLASS CO.
VINELAND, N. J.

Check 3186 opposite last page.

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Leaders in Your Industry Have Selected "NATIONAL" as the Leader in the Field of

® **PERFORATED APRON-TYPE CONVEYOR DRYERS**

Famous names among the manufacturers and processors of chemicals, fibers and allied products are proudly listed in the growing roster of "NATIONAL" customers.

These companies, by their selection of "NATIONAL" Perforated Apron-Type Conveyor Dryers, have demonstrated their belief in the outstanding leadership which "NATIONAL" has earned in the design and construction of this and related types of drying and conditioning equipment.

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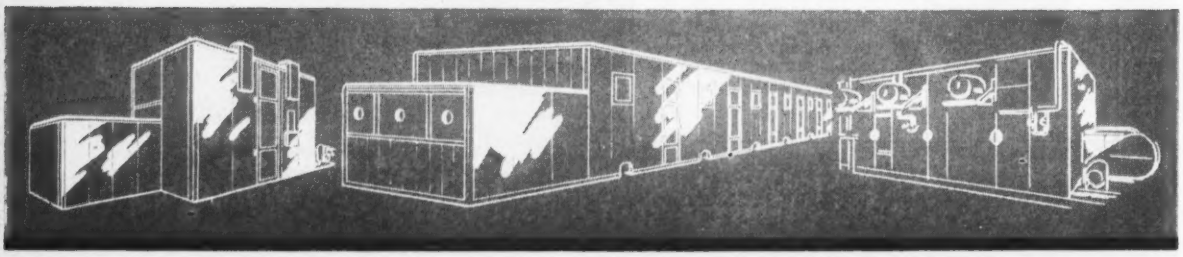

Check 3187 opposite last page.

ray spectrograph and diffraction methods. First results were rough and indicated the principal constituents. When preliminary analyses were completed, a fourth sample of relatively pure scheelite was analyzed to develop standards for accurate determinations.

Here's the final result. The fixed-count X-ray technique gave the most accurate result while linear measurement of pulse-height was most rapid.

Aids Crystal Studies

In the Chemistry Department, extensive studies are being made on soaps and detergents. Part of the research involves crystal structure determinations with X-ray analysis techniques.

One development of the Department to speed this research is a linear-to-log converter and integrator. The instrument is utilized on single crystal X-ray diffraction data.

In operation, chart paper with densitometer recording is fed to the converter at a constant speed. Operator manipulates a pointer to follow the curve. Motion of pointer is converted by cam action and a powerstat into a voltage proportional to intensity represented by ordinate height. Since watts vary as a function of time, the action integrates the curve and gives a result which is proportional to total intensity represented by the curve.

In the Anatomy Depart-

"2127, 2128, 2129 . . ."

Thanks to S. J. Martinez, Dowell, Inc., Tulsa, Okla.

ment, research involves complete structure determinations of biologically important compounds. Work is in progress in determining structure of nucleotides and other phosphorus-containing compounds. Correlation of biological activity with molecular structure is also being studied.

Without it being the intent of the groups, investigational work, at the University of Washington, using X-ray analysis techniques is demonstrating the versatility of the methods. Problems are being solved readily, sometimes in a matter of minutes, by the X-ray techniques that would have been extremely difficult by other methods.

(X-ray spectrometer and diffractometer are products of Instruments Division, Philips Electronics, Inc., 750 S. Fulton Ave., Mt. Vernon, N.Y.)

Check 3188 opposite last page.

Highly resistant glass is developed

Borosilicate hard glass to be used for lab ware

Uses: As tough, hard glass for manufacturer's line of laboratory and scientific glassware items.

Features: Recently developed hard glass is completely interworkable with other hard glass apparatus having same linear coefficient of expansion. Addition of hard glassware to manufacturer's laboratory line will allow user to qualify more readily for maximum quantity discounts.

Description: Called Kimax, hard glass is a borosilicate which is said to match or equal any similar hard glass. Some 370 different items, each in a wide range of sizes and capacities, already are in production. Linear coefficient of expansion is 32.5 x 10^{-7} $cm^2/°C$.

(KG-33 borosilicate glass is product of Kimble Glass Company, subs. of Owens-Illinois Glass Company, Toledo, Ohio.)

Check 3189 opposite last page.

Now-the Wraps Are Off!

NEW Sharples HIGH CAPACITY Super-D-Canter . . . and HIGH CAPACITY Nozljector

both available for operation up to 150 psi

THE SHARPLES CORPORATION

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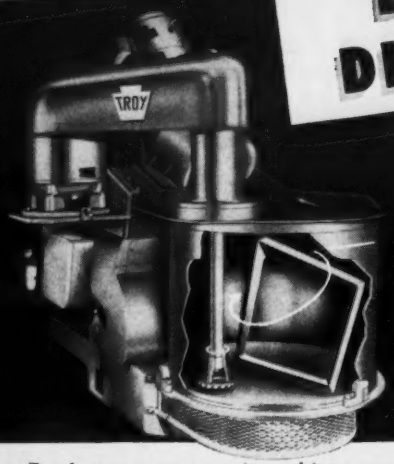
Check 3190 opposite last page.

NEW! TROY

DUPLEX DISPERSER*



Produces Finished Product in One Operation

TROY

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Troy's new compact unit combines a powerful disperser head with the rugged diamond-shaped agitator to produce finished homogeneous batches **without further milling** — for the majority of present inks and paints.

Modern design gives proportional hydraulic shear, kinetic impingement and mulling action for better wetting, improved color dispersion and uniform blending. Send samples for trial processing.

Write Troy for details of special Capital-Purchase plan.

TROY Engine & Machine Co. 706 Parsons Street Troy, Pennsylvania

Check 3191 opposite last page.

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PRESSING — DRYING and COOLING Equipment

Continuous DeWatering Presses

ROTARY DRYERS Steam Tube, Hot Air and Direct Fire

Atmospheric DRUM DRYERS

ROTARY COOLERS Water and Air

WHAT THIS PILOT PLANT *Means to You*

This laboratory can pre-determine the advantages of a continuous operation of pressing and drying.
This pilot plant, consisting of a Continuous Mechanical Press, Rotary Steam Tube Dryer and Rotary Fired Dryer, can provide you with the necessary data for determining the economical operation of a commercial size unit for your particular problem.
Let our engineers assist you with your de-watering problems.
Catalog C available of our equipment.

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Davenport, Iowa, U.S.A.

Check 3192 opposite last page.

LABORATORY

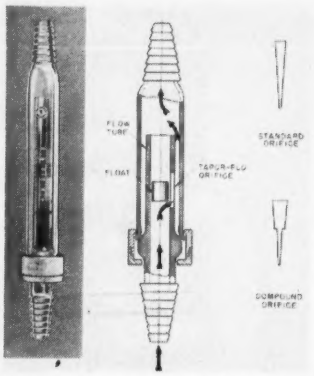
Meters low flow rates despite fluctuating line pressures

Float lines-out quickly without bobbing

Uses: Measuring low flow rates under conditions of fluctuating line pressures in research, pilot plant, and bench-scale operations.

Features: All-glass, variable area flow indicator is designed for "no-bob" float stability.

Description: Glass flow meter has superfine-finish float positioned in a precision-bore tube. As flow rate increases or decreases, the float rises or falls, proportionately exposing more or less of a V-shaped orifice. Precisely shaped by ultrasonic impact grinding, orifice is designed to position float directly proportional to flow rate.



Glass flow meter (left) is designed for pressure to 80 psi. Schematic diagram (center) indicates operation. Tapered orifices (right) may be either standard or compound

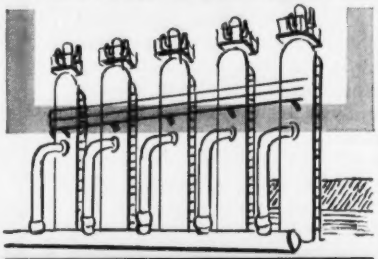
Flow value is indicated on an evenly graduated scale etched into flow tube. Meter range can be changed by replacing float.

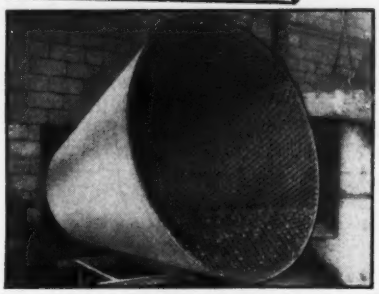
Meter may be used at operating pressures to 80 psi at 70°F. Maximum operating temperature is 150°F. Standard flow tube sizes are ¼ or ½ in ID.

(MB Series Tapor-Flo flow meter is product of C-Mar Corporation, 35 Euclid Avenue, Manasquan, New Jersey.)

Check 3193 opposite last page.

FEWER "TURN-AROUNDS"





Shutdowns for repairs of fire clay linings in refractory units are expensive. The frequency and duration of these shutdowns can be greatly reduced by the use of a steel grating armor known as "Gridsteel", which holds the castable refractory linings in place longer and armors them against the bombardment of catalytic elements.

"Gridsteel" is available in a special loose clinch to conform easily to curved surfaces.

For complete information, write for brochure on Irving "Gridsteel" Contour Retainer Mesh

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1850 10th St., OAKLAND 23, CALIFORNIA

Check 3194 opposite last page.

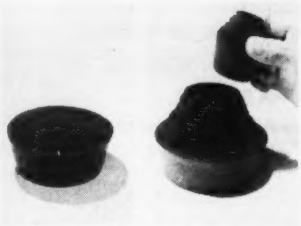
One rubber stopper fits 17 different size openings

Accommodates openings from 22 to 100 mm

Uses: As a unique rubber stopper that can be made to fit as many as 17 different size openings, ranging from 22 to 100 mm.

Features: Stoppers are available in black rubber or sulfur-free neoprene.

Description: Four-inch stopper is essentially a Size No. 15, sliced into 17 concentric tapered rings. Each ring



One rubber stopper fits 17 different size openings

or group of rings can be added to or subtracted from the core until desired fit is obtained. All rings form a vacuum-tight fit.

One or more of the rings can be used as gaskets or bushing between tubing, bottles and other glassware. Taper allows insertion of other solid or multiple hole rubber stoppers as well as tapered ground glass joints.

("Pluro Stopper" is manufactured by Bethlehem Apparatus Co., Inc., Hellertown, Pa.)

Check 3195 opposite last page.

pH meter electrodes

Four-page removable center spread, which describes and illustrates all Beckman pH electrodes presently available for laboratory and portable pH meters, is feature of 16-page bulletin covering laboratory equipment. Lanco Apparatus News, Vol 9, No. 1 — Arthur S. LaPine & Company, Chicago 29, Illinois.

Check 3196 opposite last page.

NOW...
you can make
MOISTURE TESTS IN MINUTES
with the fully automatic
IR MOISTURE -MATIC BALANCE
Tests anything that can be oven-dried... just load... set time and heat... and let the instrument do the rest.
ALL the operator has to do is load the pan and set the timer and heat control to get quick, accurate, permanently recorded moisture readings of granular solids, pastes, liquids, waxes or anything else that can be dried by heat.
The portable IR Moisture-Matic, a product of Moore-Milford Corporation, utilizes far infrared for highest absorption and rapid, even heating, and has both a self-contained timer and variable heat control between 30 and 600 watts. The motor driven torsion balance automatically weighs the sample after the test, and the moisture percent is retained on a 3 digit counter to the nearest 0.1 percent. Operates on 115-volts, 60 cycles AC.
All components are of instrument quality to assure long life without maintenance expense. For guaranteed accuracy and speed in your moisture testing, ask your Scientific Products representative for a demonstration or write us today.
IR Moisture-Matic Balance complete, ready for use...
$325.00
S/P
Scientific Products—a single source for all laboratory supplies and equipment—offers a complete selection of moisture testers for every application.
Scientific Products
DIVISION OF AMERICAN HOSPITAL SUPPLY CORPORATION
New York • Chicago • Kansas City • Minneapolis • Atlanta • Washington • Dallas
Los Angeles • San Francisco

Check 3197 opposite last page.

FOR CORROSIVE OR COSTLY FLUIDS OR GASES GET THE FACTS ON

CHEMLON® PACKINGS

FABRICATED FROM DUPONT TEFLON

...acids, alkalis, solvents, toxics, food products up to 600°F.

JOHN CRANE'S line of Chemlon Packing offers an unlimited selection of types, shapes and sizes for practically every service requirement:

. . . . . types best suited for valves and automatic regulators.

. . . . . for high or low-speed centrifugal, rotary or reciprocating pumps.

. . . . . for agitators and mixers.

Here in one bulletin is illustrated and described industry's most complete line of chemically inert packings. You'll save time, trouble and expense on fluid or gas handling problems by requesting Bulletin P-325.

Crane Packing Company, 6421 Oakton Street, Morton Grove, Illinois (Chicago Suburb). *In Canada: Crane Packing Co., Ltd., Hamilton, Ont.*

John Crane

MECHANICAL PACKINGS | SHAFT SEALS | TEFLON PRODUCTS | LAPPING MACHINES | THREAD COMPOUNDS

CRANE PACKING COMPANY

Check 3198 opposite last pa

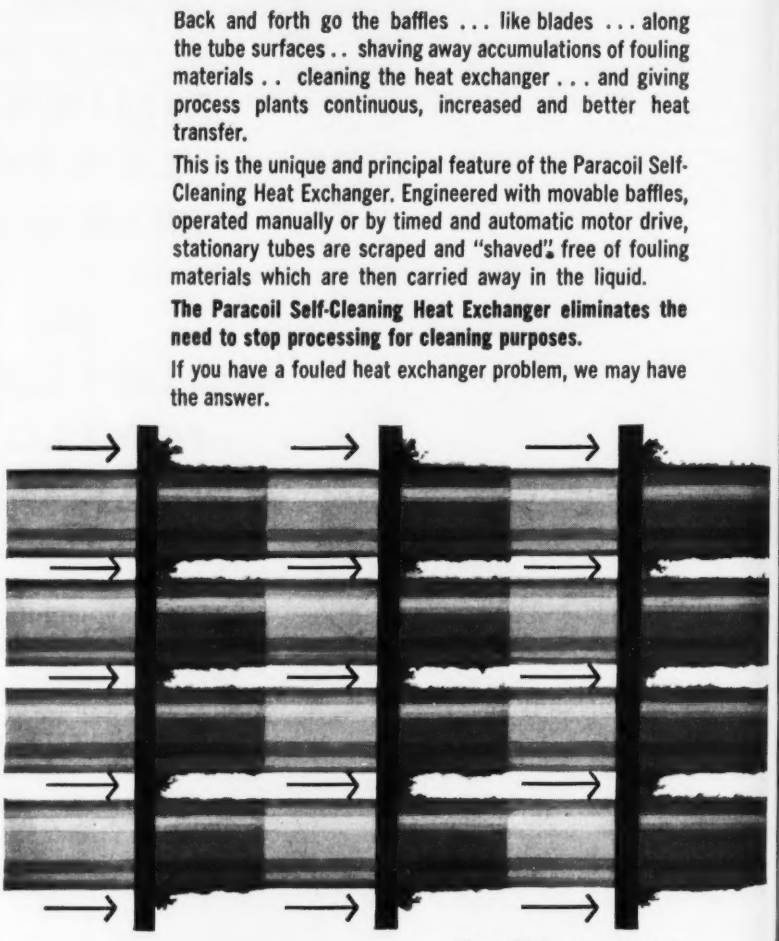
How a Paracoil "clean shave" gives you better heat transfer

Back and forth go the baffles . . . like blades . . . along the tube surfaces . . shaving away accumulations of fouling materials . . cleaning the heat exchanger . . . and giving process plants continuous, increased and better heat transfer.

This is the unique and principal feature of the Paracoil Self-Cleaning Heat Exchanger. Engineered with movable baffles, operated manually or by timed and automatic motor drive, stationary tubes are scraped and "shaved" free of fouling materials which are then carried away in the liquid.

The Paracoil Self-Cleaning Heat Exchanger eliminates the need to stop processing for cleaning purposes.

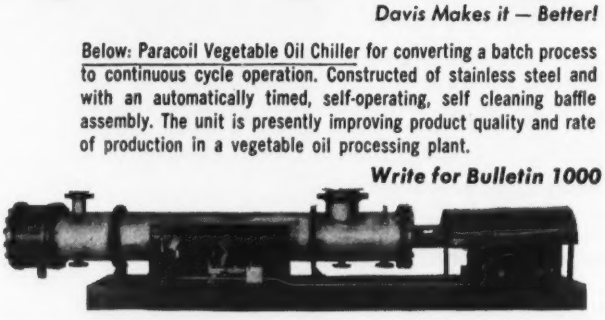
If you have a fouled heat exchanger problem, we may have the answer.



Davis Makes it — Better!

Below: Paracoil Vegetable Oil Chiller for converting a batch process to continuous cycle operation. Constructed of stainless steel and with an automatically timed, self-operating, self cleaning baffle assembly. The unit is presently improving product quality and rate of production in a vegetable oil processing plant.

Write for Bulletin 1000



DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York • Circle 6-5650

Check 3199 opposite last page.

Corners of fume hood cut out dangerous residue deposits

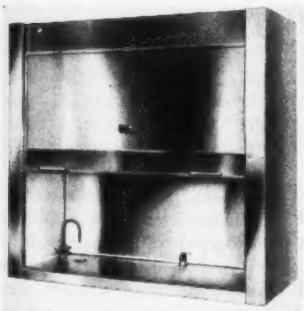
Rounded corners, integrally-welded are used throughout

Uses: For laboratory applications where hazardous radioactive and perchloric material is involved.

Features: Spherical corners cut out dangerous residue deposits. Cleaning of hood is made positive and easy.

Description: Heavy stainless steel fume hood uses ½-inch-radius spherical corners to eliminate cracks and seams that collect residues of dangerous and corrosive agents. Integrally-welded, rounded corners are ground smooth and finished to match adjacent surfaces to working area.

Hood consists of two basic parts: inner stainless steel shell with working surface and fluorescent light assembly fits in an outer superstructure



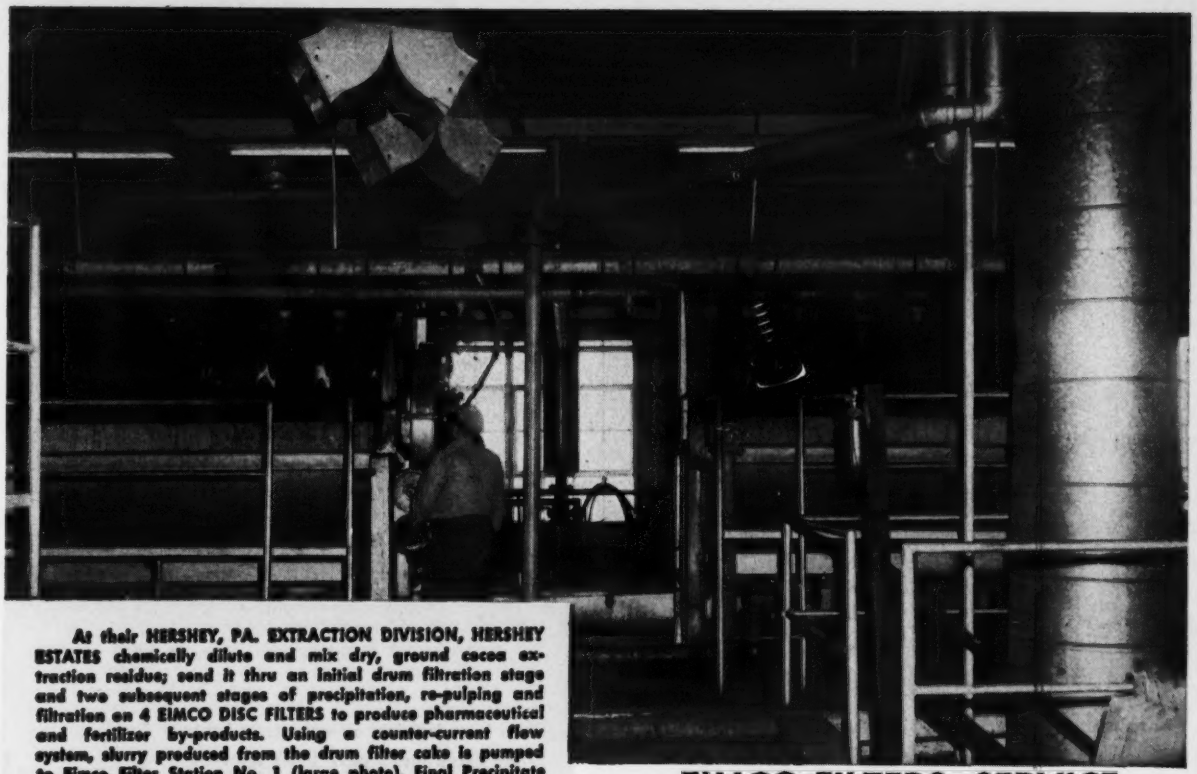
Rounded-corner construction of fume hood eliminates cracks and seams that collect residues of dangerous and corrosive agents

housing of 18-gage cold rolled steel, a sash that slides on adjustable ball-bearing rollers, and frames either ¼" safety or explosion-proof glass on stainless steel, completes unit.

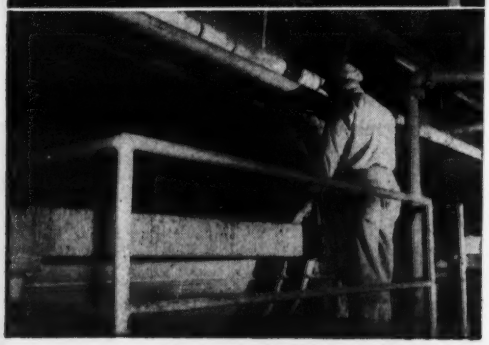
The heavy die-formed dolstrum section underframe solidly reinforces hood. Lighting assembly housings, accessible from outer superstructure, are sealed behind shatter-proof wired glass.

(Fume hood is product of The Warren Corp., 2901 Brighton Rd., Pittsburgh 12, Pa.)

Check 3200 opposite last page.



At their HERSHEY, PA. EXTRACTION DIVISION, HERSHEY ESTATES chemically dilute and mix dry, ground cocoa extraction residue; send it thru an initial drum filtration stage and two subsequent stages of precipitation, re-pulping and filtration on 4 EIMCO DISC FILTERS to produce pharmaceutical and fertilizer by-products. Using a counter-current flow system, slurry produced from the drum filter cake is pumped to Eimco Filter Station No. 1 (large photo). Final Precipitate is gravity fed to Eimco Filter Station No. 2 (directly below), and the end-product is transported to storage on a continuous belt conveyor. Bottom photo shows closeup of Eimco Disc cake formation.



EIMCO FILTERS - SERVICE WIN HERSHEY'S CONFIDENCE

HERSHEY, PA. - Client confidence in Eimco filter equipment and service over a period of 15 years, is expressed by **Mr. H. B. Brewer,** operating manager of the **Extraction Division, Hershey Estates.**

In 1941 . . it became feasible to add a two stage precipitation, re-pulping and disc filtration process to the flowsheet producing by-products from dry, ground cocoa extraction residue.

Mr. Brewer describes operation of two disc filter stations subsequently designed and installed by Eimco, "highly satisfactory. Over a 15 year period of around the clock operation, they have given us a dependable, efficient operation that has increased production and improved product quality."

This performance is a tribute to the durability and high mechanical operating efficiency of **Eimco** equipment and **Hershey's** intelligent maintenance program on a "planned" rather than "emergency" basis. From time to time, **Eimco** engineers and **Hershey** technologists have worked hand in hand to develop improvements to bring plant capacity to its present 90 tons of solids-per-day production.

The skills and experience that have won such lasting client confidence are at your disposal. Write today . . there's an Eimco Branch and Engineer in your vicinity.

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-53 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

EIMCO

8-288

Check 3201 opposite last page.

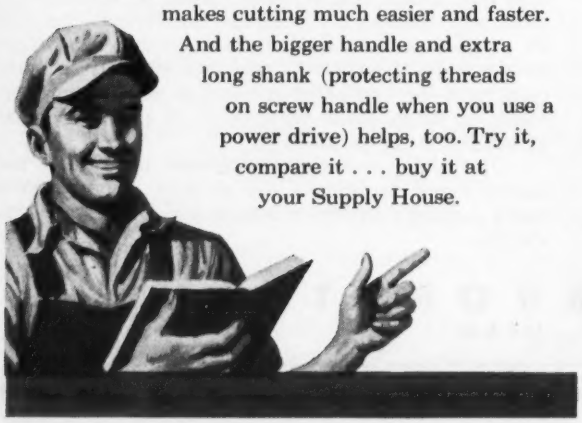
So you get easier quicker action with

New

RIGID

Heavy-Duty Pipe Cutters

The instant you start feeding in this new cutter on a pipe you feel the remarkable difference, the new cushioning effect that makes cutting much easier and faster. And the bigger handle and extra long shank (protecting threads on screw handle when you use a power drive) helps, too. Try it, compare it . . . buy it at your Supply House.



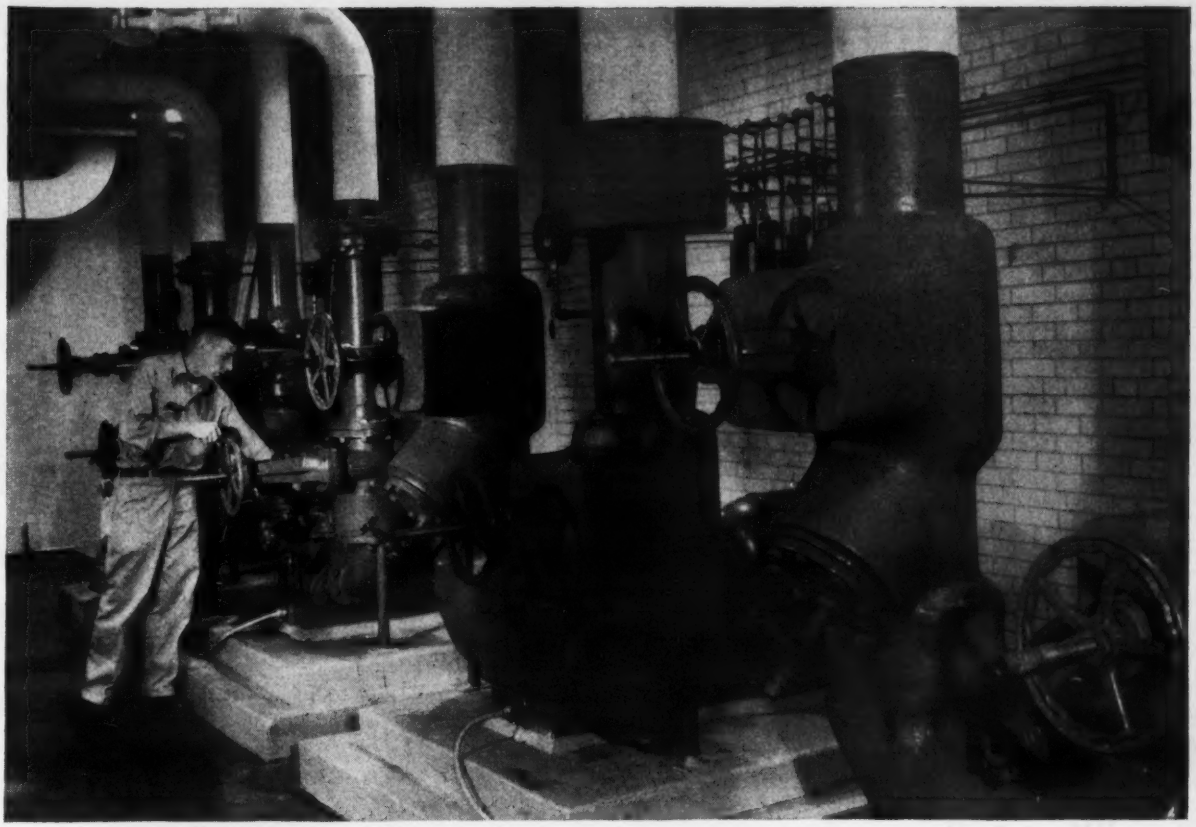
Check 3202 opposite last page.

To have interiors of tank trucks hauling alkyd resins pass 'black light' inspection, eight hours of cleaning were required. By changing to a special detergent compound and using a four-nozzle rotating-head sprayer, Reichhold Chemicals Co. has . . .

cut cleaning time 90% on resin tank trucks

Problem: Cleaning of 5000-gal tank trucks at Reichhold Chemicals Co., Inc., Ballardvale, Mass., took up to eight hours per truck. To assure complete cleanliness, man wearing rubber suit, hood, and oxygen mask had to spend two hours inside tank brushing all surfaces with xylol solution.

Cleaning operation proceeded as follows: Tank truck containing residue of alkyd resin was loaded with caustic solution and heated to boiling with an open steam line. Truck was then driven over rough roads to provide agitation, which took several hours. Caustic was then dumped and surfaces rinsed with water.



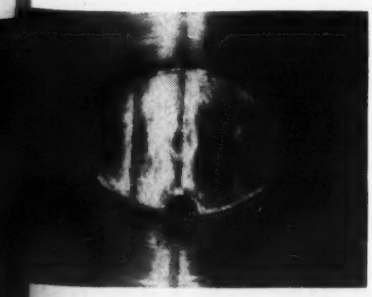
Rotating cleaning unit, being lowered into tank truck at Reichhold, delivers spray of solution at 100 psi. Cleaning time has been cut from eight hours to less than an hour

Then came the man in the rubber suit with xylol solution. During his stay inside, a rope was attached from his waist to point outside tank where another man would check his progress for safety reasons.

After cleaning, quality control man would check interior surfaces with black light to be sure all residue had been removed. This method was chosen because products, on delivery to customers, are passed through filter that is then screened with black light. Any foreign matter which remained from previous loads is immediately detected and the load rejected.

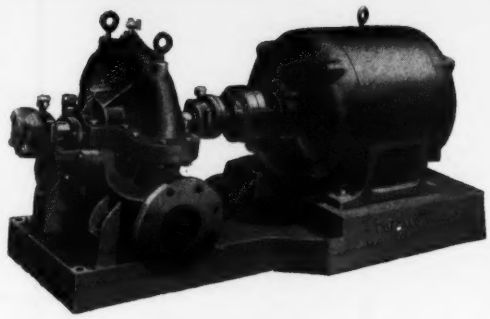
Solution: In mid 1956, Reichhold installed a chemical cleaning system for resin-carrying tank trucks. Here is how present procedure works. First, four to six ounces of heavy-duty alkaline powder-type detergent (Composition 24) are added to 500 gal of water, and solution is brought to rolling boil. First 50 gal are pumped into tanker and permitted to go down the drain. This first flush removes heavy alkyds and avoids con-

To page 185

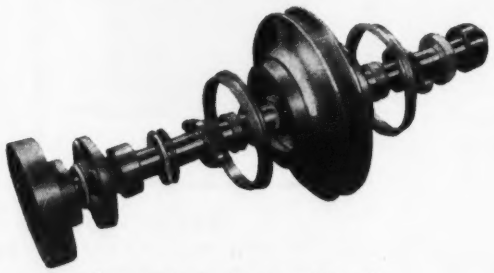


Gleaming interior of tank demonstrates efficiency of cleaning operation at Reichhold

Truck in position for cleaning. Interior of 5000-gal tank must pass black light inspection when process is complete



"Buffalo" Type SL Double Suction Pump, industry's choice for clear water service in capacities from 10 to 14,000 gallons per minute.



Impeller and shaft assembly of "Buffalo" Type SL Pumps. Note precision ball bearings, husky shaft, wearing rings and efficient enclosed impeller.

FOR PERMANENT PUMPING EFFICIENCY

Don't Leave Out the "Q" Factor*

"Buffalo" PUMPS like the Type SL Double Suction Pumps above, handling chilled water in a large plant, *assure* this permanent efficiency! Their design and construction go far beyond "good enough". Their ample water passages and well designed impellers — providing smooth hydraulic balance and efficiency — reflect the high standard of engineering, foundry and machining craftsmanship developed in our 80 years of building pumps. We call this standard the "Q" Factor*, and it's the reason behind the permanent pumping efficiency enjoyed by owners of "Buffalo" Pumps everywhere. Write for Bulletin 955 and see why you save by specifying the best!

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

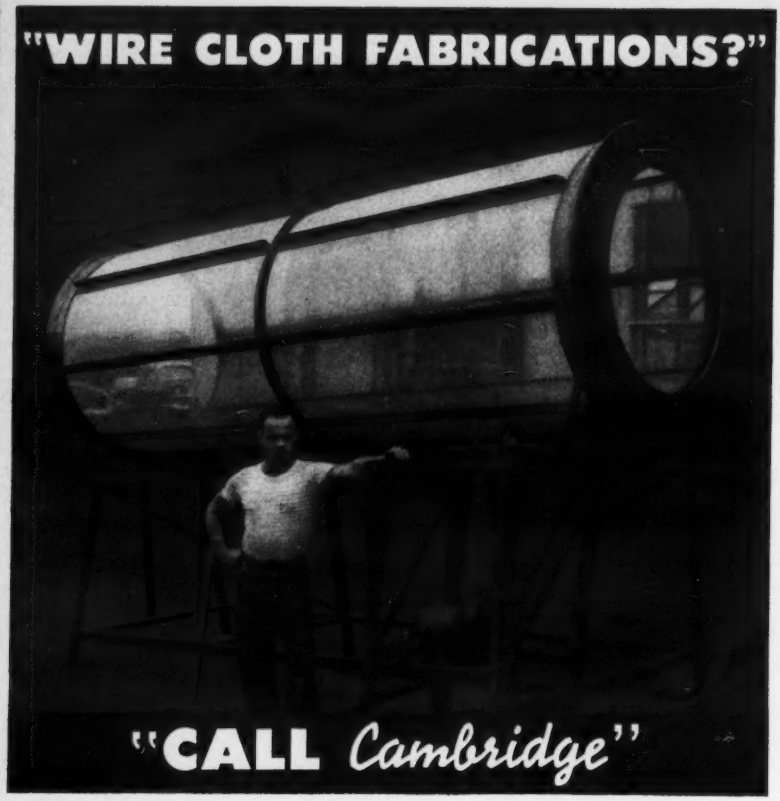
BUFFALO PUMPS
Division of Buffalo Forge Co.
524 Broadway • Buffalo, N. Y.
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

"Buffalo" PUMPS

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Check 3203 opposite last page.

"WIRE CLOTH FABRICATIONS?"



"CALL *Cambridge*"

"You tell us what you need, and we'll have it for you fast—whatever the size or shape"

Roland's right, too. Here at Cambridge he's part of a team that has produced everything from thimble-sized strainers to king-sized dewatering screens, often well ahead of schedule. Whatever your requirements, you're assured of quality workmanship and prompt service when you call Cambridge. And, we'll work from your specifications or draw up prints for your approval.

TO MEET YOUR BULK WIRE CLOTH NEEDS, we have a wide variety of specifications from the finest to the coarsest mesh—in any metal or alloy—in the most frequently used specifications ready for immediate shipment. Individual loom operation and careful inspection just before shipment assures accurate mesh count and uniform mesh size.

Let us quote on your next order for wire cloth. Call your Cambridge Field Engineer listed in the telephone book under "Wire Cloth". Or write direct for FREE 94-PAGE CATALOG and stock list giving the full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

The Cambridge Wire Cloth Company

WIRE CLOTH · METAL CONVEYOR BELTS · SPECIAL METAL FABRICATIONS

DEPARTMENT F,
CAMBRIDGE 1,
MARYLAND

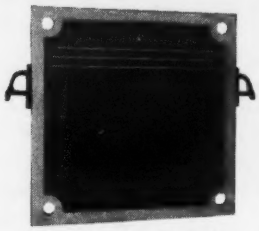
OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 3204 opposite last page.

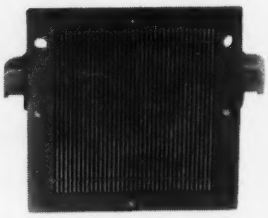
DESIGNED TO PROTECT PRODUCTION

Large filter press with rubber-covered cast iron plates and frames.

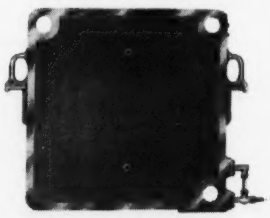
SHRIVER FILTER PRESSES



Polyester plate fiberglas-reinforced.



Solid rubber plate.



Stainless steel plate.

Are Made to Protect
- **The Equipment**
- **The Purity of Product**

To meet any corrosive, abrasive or other conditions during filtration which may be destructive to equipment or harmful to purity and quality of the material being processed, Shriver Filter Presses can be supplied with plates and frames.

1—Of cast iron or aluminum coated with polyvinyl chloride or other resins, or with rubber.

2—Of solid rubber, glass-reinforced polyester, Haveg, stainless steel or other alloys.

The factors of suitability, first cost, strength and available filtering area must be considered specifically for each application.

We'll be glad to consult with you on the best means of "protective" filtration.

T. SHRIVER & COMPANY, INC.

846 HAMILTON STREET · HARRISON, N. J.

SALES REPRESENTATIVES IN: Decatur, Ga.—Houston, Tex.—Livonia, Mich.—St. Louis, Mo. San Francisco, Cal.—Montreal, Que.—Toronto, Ont.

FILTER PRESSES · VERTICAL LEAF FILTERS · FILTER MEDIA
HORIZONTAL PLATE FILTERS · CONTINUOUS THICKENERS
SLAB FORMERS · DIAPHRAGM PUMPS · ELECTROLYTIC CELLS

Check 3205 opposite last page.

From page 183

taminating remaining cleaning solution.

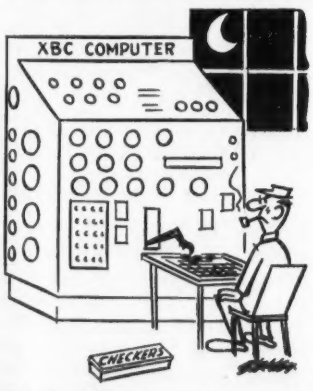
At this point, truck pump is hooked to return hose and about 100 gal of cleaning solution permitted to accumulate in bottom of tanker. This prevents truck recirculation pump from exhausting air and creating a vacuum. Boiling cleaning solution is sprayed into truck interior through rotating cleaning head at 100 psi. Four nozzles revolve vertically while entire unit turns horizontally so that solution reaches every square inch of interior surface.

After tanker has been cleaned for 20 minutes, cleaning solution is dumped. Rinsing is then carried on for 20 minutes using previously heated rinse water. Interior is then checked with black light for any remaining particles.

Results: Tank trucks consistently pass black light inspection for cleanliness. Cleaning time has been reduced from eight hours to less than an hour. Reichhold's management can now be sure that no cross contamination of products will occur or loads be rejected because of incomplete cleaning of tanks.

(Cleaner and cleaning system were supplied by Oakite Products, Inc., 19 Rector St., New York 6, N. Y.)

Check 3206 opposite last page.



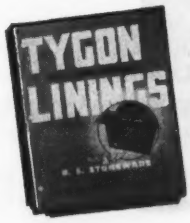
Our thanks for this cartoon goes to Tom Blakley of Florida East Coast Fertilizer Company, Homestead, Fla.

A new **TYGON TANK LINING**

- dense, extruded body
- non-oxidizing—for long service life
- excellent chemical resistance —particularly to chromic and other oxidizing acids
- negligible extractibility
- high electrical resistivity
- tough, abrasion-resistant

This new Tygon tank lining material (Formulation 105A) represents a major step forward in the development of plastic linings for corrosive service. This new lining is *extruded*, not calendered. It is completely free of laminations, hence no "peeling" in service. It shows excellent resistance to highly oxidizing acids, including chromic.

103-F



Tygon Tank Linings can be installed at our plant or in the plants of licensed fabricators throughout the United States and Canada. Write today for Bulletin TL-526R.

U. S. STONEWARE
AKRON 9, OHIO

Check 3207 opposite last page.

They look like twins... but one is synchronous

Louis Allis "SYNCRO-*SPEDE*"* offers... for the first time... a synchronous motor in the same frame sizes as a standard induction motor

New from Louis Allis — *the most compact and efficient synchronous induction motor on the market* ... the revolutionary "Syncro-Spede." It's the *only* synchronous motor built in standard NEMA frames for comparable ratings in any enclosure.

The space-saving "Syncro-Spede" has no external excitation, wound rotating fields, collector rings or brushes—offers simplified control and low-cost operation. And it's virtually maintenance-free.

In performance, "Syncro-Spede" delivers and maintains exact synchronous speed within its rated capacity, regardless of load variations or voltage dips. When "Syncro-Spede" motors of several different ratings are powered by a single adjustable-frequency source, their acceleration, running speed, and deceleration can be synchronized.

"Syncro-Spede" is the low-cost answer to such demanding synchronous applications as *precise adjustable-frequency multi-motor systems*... high-frequency generator drives and constant-speed conveyor drives . . . precision timing and metering devices . . . recording instrument drives . . . any system requiring constant speeds from no-load to full-load.

"Syncro-Spede" sizes range up to 100 hp. For information and expert application engineering assistance, contact your nearby Louis Allis District Office or write directly to The Louis Allis Company, 448 East Stewart Street, Milwaukee 1, Wisconsin.

*"Syncro-Spede" is a trademark of the Louis Allis Co.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

Check 3208 opposite last page.

For service at 2630 psig, 450°F working pressure — 2500-lb valve

Of cast alloy steel

Uses: For regulating service in process industries.

Features: Unusually high-pressure service, 2630 psig. with working pressure at 450°F, has not been associated with this type of valve.

Description: R-S 2500-pound, 14" cast alloy-steel butterfly valve is equipped with welding ends and manual control.

(Butterfly valve is product of S. Morgan Smith Company, York, Pennsylvania.)

Check 3209 opposite last page.

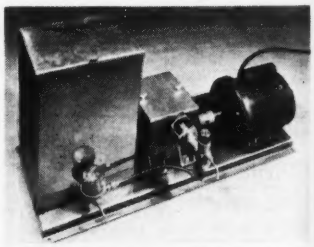
Chemical injector pump driven by electric motor

Meters liquid chemicals against 1200-psi pressure

Uses: For injecting measured amounts of liquid chemicals into flow lines and pressure vessels.

Features: Pump is driven by electric motor, and accurately meters liquid chemicals against pressures up to 1200 psi.

Description: Chemical metering pump is operated by



Injector pump accurately meters liquid chemicals into flow lines and pressure vessels

¼-hp, 1750-rpm electric motor. The 50-to-1-reduction worm-gear assembly operates cross-head drive mechanism to move the piston injectors. There may be one or two piston injector assemblies on each pump, and each piston may inject measured amounts of a separate chemical at the same time. Output may be ac-

curately pre-set to inject from a few ounces to 40 gal in a 24-hour period, with one injector head, by regulating length of piston stroke and by size of pistons.

Pump is available with three standard size piston-injector head assemblies; the ¼" piston pumps against 1200 psi pressure, ⅜" piston pumps against 500 psi, and ½" piston pumps larger volume against 250 psi pressure. Each piston has separate calibrated stroke adjustment which may be locked in position. By using variable speed motors and timers, discharge output may be further regulated. Explosion-proof motors, air-gas turbines, or light-duty, ¾-hp gasoline engine may also be used to drive the pump.

(Model SAC-4000 chemical injector pump is product of Texsteam Corporation, Div. of Vapor Heating Corporation, 320 Hughes St., Houston 11, Texas.)

Check 3210 opposite last page.

Continuous lubrication for conveyor chains by spray lubricator

Uses: For lubricating conveyor chains.

Features: Unit continuously and automatically lubricates chains that are moving rapidly or are close-coupled.

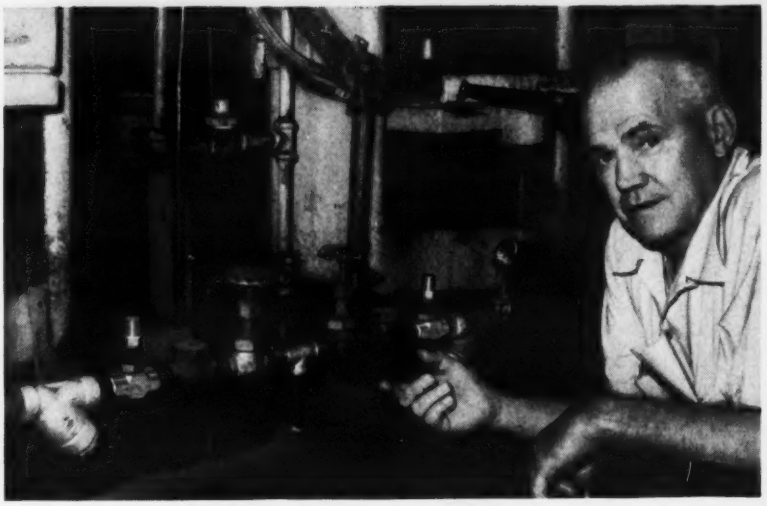
Description: Automatic conveyor lubricator is designed to apply thin coat of lubricant on chain links. Air passes through solenoid valve into lubricator reservoir. Lubricant is conducted from reservoir through tubing to outlet nozzles which, in turn, spray lubricant continuously on chain.

There is no tripping mechanism — solenoid valve is wired, on inlet, to the starting switch on chain drive. When conveyor starts, lubrication starts and is continuous as long as chain is in motion.

(Model 115X-S automatic conveyor lubricator is product of J. N. Fauver Company, Inc., 51 West Hancock, Detroit 1, Michigan.)

Check 3211 opposite last page.

"our Yarway Impulse Traps give good performance, free from worry"



"Our presses are individually trapped with Yarways—over 100 of them in the plant"

Q. Mr. Terrill*, you have more than 100 Yarway Impulse Steam Traps on almost every press in this Boonton Molding Co. plant. Why do you use Yarway?

A. Because we never have to worry about them. They give good performance on our presses 24-hours a day and never cause any trouble.

Q. How long have you been using Yarways?

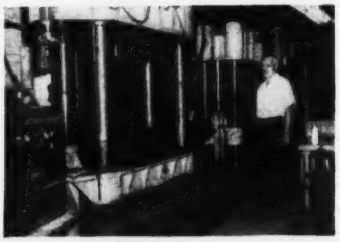
A. We started 5 years ago. Now we're almost 100%. There are only a few other type traps left. They'll soon be replaced by Yarways.

Q. These presses are pretty hot. At what temperatures do you mold?

A. About 350°F. That's another advantage of Yarways. They *keep* the presses at high molding temperatures.

Q. Any other advantages?

A. Sure. Small size, small inventory of parts, and they're easy to order from our distributors.

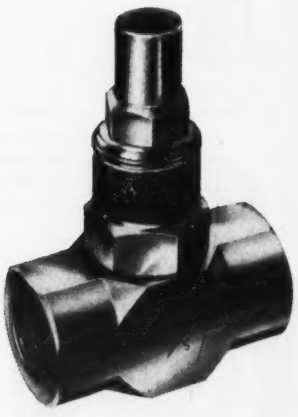


"Yarways never cause us any trouble"

For free copy of new booklet, "The Why and How of Steam Trapping," write:

YARNALL-WARING COMPANY
125 Mermaid Avenue
Philadelphia 18, Pa.

*STANLEY TERRILL,
Plant Engineer, Boonton Molding Co., Boonton, New Jersey



YARWAY Impulse ...a good way to specify steam traps

OVER 1,200,000 YARWAY IMPULSE STEAM TRAPS ALREADY USED • STOCKED AND SOLD BY 275 CONVENIENT LOCAL INDUSTRIAL DISTRIBUTORS • NATION-WIDE YARWAY ENGINEERING STAFF AT YOUR SERVICE.

Check 3212 opposite last page.

"K" flanges and flanged fittings all sizes through 12".

"K" screwed fittings ¼" through 12".

- OVERCOME CORROSION
- PROMOTE SAFETY
- REDUCE MAINTENANCE

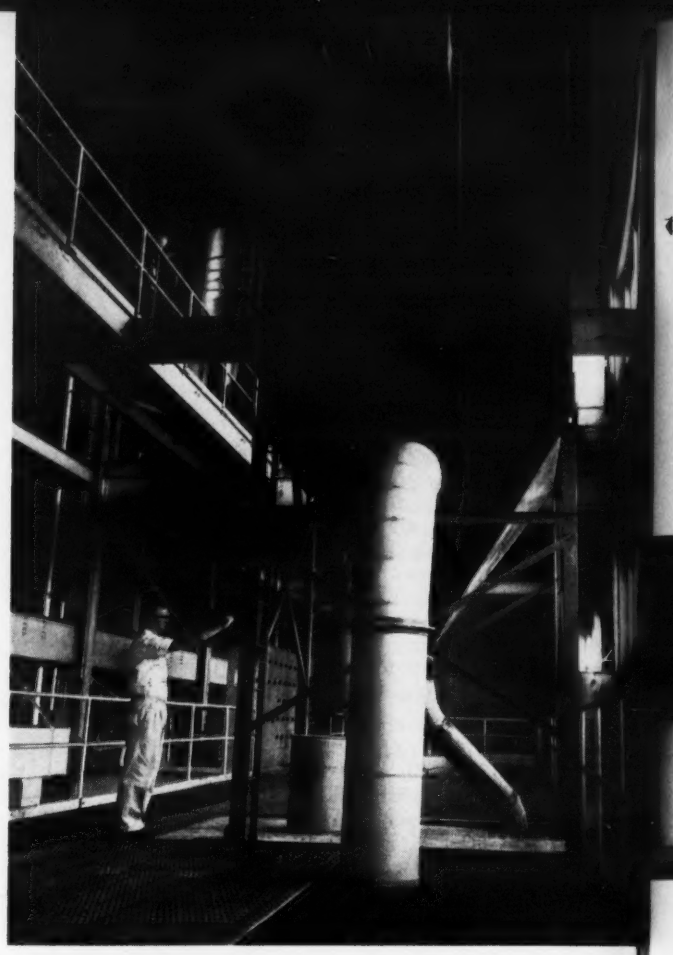
These are just a few of the reasons why more and more companies specify Kuhns ductile iron fittings, pressure rated by Underwriters' Laboratories, Inc. If you're handling corrosive or volatile fluids, send for complete details today.

"K" fittings available nationally through better wholesalers

K

THE KUHNS BROTHERS CO.
1800 McCALL STREET • DAYTON, OHIO

Check 3213 opposite last page.



After unsuccessful experiences with a fly-ash arrestor and wet collection system, Dearborn Chemical Co. hit the jackpot with single-compartment bag collector that . . .

removes all fines from air conveying system

GEORGE MICHAEL, Assistant Editor
R. B. SHEWFELT, Maintenance Superintendent
Dearborn Chemical Co., Lake Zurich, Ill.

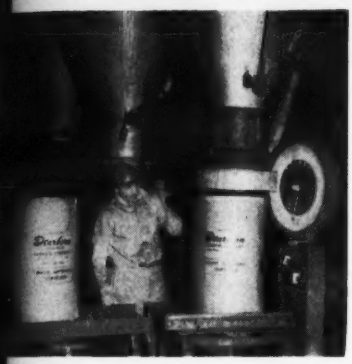
Problem: Dusts, especially the fines, were proving difficult to collect from pneumatic handling operations at Dearborn Chemical Co.'s Lake Zurich, Ill., plant. Two different types of dust collection were tried. Both proved inadequate and costly to operate.

The fines were definitely too hygroscopic for fly-ash arrestor first tried. Material escaped on roof, causing much dust around plant. Two men had to spend several hours a day sweeping out the building.

Next a wet-system was developed where air was passed through coke, water sprays, and coke again. With the type of material being handled, foaming occurred. (Antifoams weren't much help.)

Maximum dust collection and practically no maintenance are features of 6000-cfm, single-compartment, multi-bag dust collector at Dearborn Chemical

Dust collector removes all fines from exhaust air of pneumatic conveying system which is tied into such operations as drumming of final product



Also, the coke clogged, allowing material to be discharged on roof and consequently back into the building.

Estimated maintenance costs on two systems were $10/day for each.

Solution: A single-compartment multi-bag dust collector was installed. Unit is constructed of steel and uses Dynel bags. Dynel was selected because of its ability to withstand deterioration from both acid and alkaline materials collected.

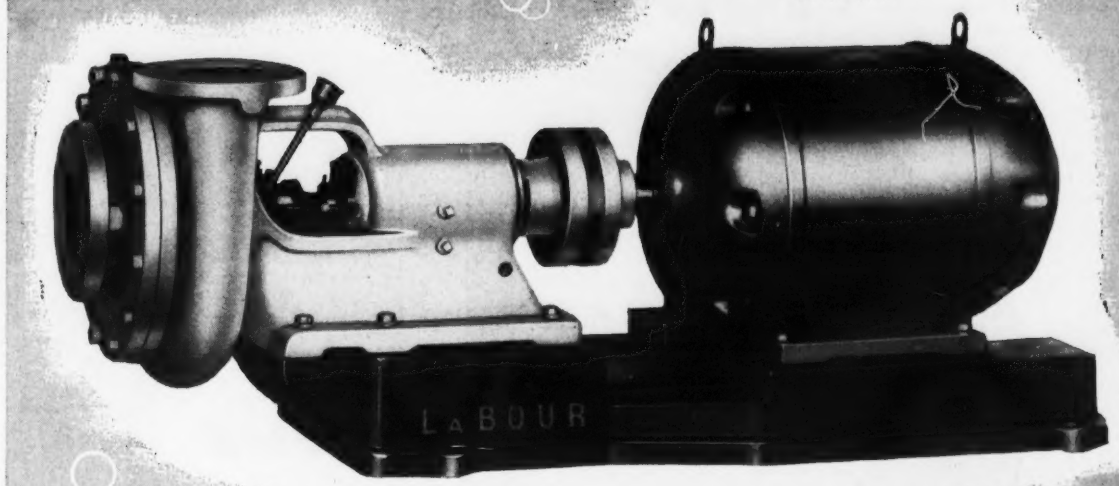
Bags are cleaned by shaking them for predetermined time interval (5 min/8 hr). Dearborn Chemical is not interested in saving the material, and all material from bags is collected in drums and discarded.

Unit's capacity is 6000 cfm.

Results: Collection efficiency is much in evidence as can be seen by condition of air in building. There is no sign of dust, and men formerly required to handle plant housekeeping have been able to concentrate their time on more important jobs.

To page 191

when BUBBLES



mean TROUBLES

Aerated solutions and volatile liquids are difficult or impossible to handle with ordinary centrifugal pumps, yet in many operations use of positive displacement pumps just brings on troubles of a different kind. The answer is LaBour Type Q, a non-priming centrifugal with extraordinary ability to handle large amounts of air or vapor mixed with the liquid it pumps.

Occasional "gulps" of air or vapor will not bind a LaBour Type Q. In general, Type Q can rid itself of gases not exceeding 20% of the total volume being pumped. Thus it is suited for many applications which would otherwise require a more costly self-priming unit.

LaBour dependability is of course a feature of this pump, which has only one moving part and no close clearances. If you're having an air or vapor problem, particularly in connection with corrosive liquids, you'd better drop us a line.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

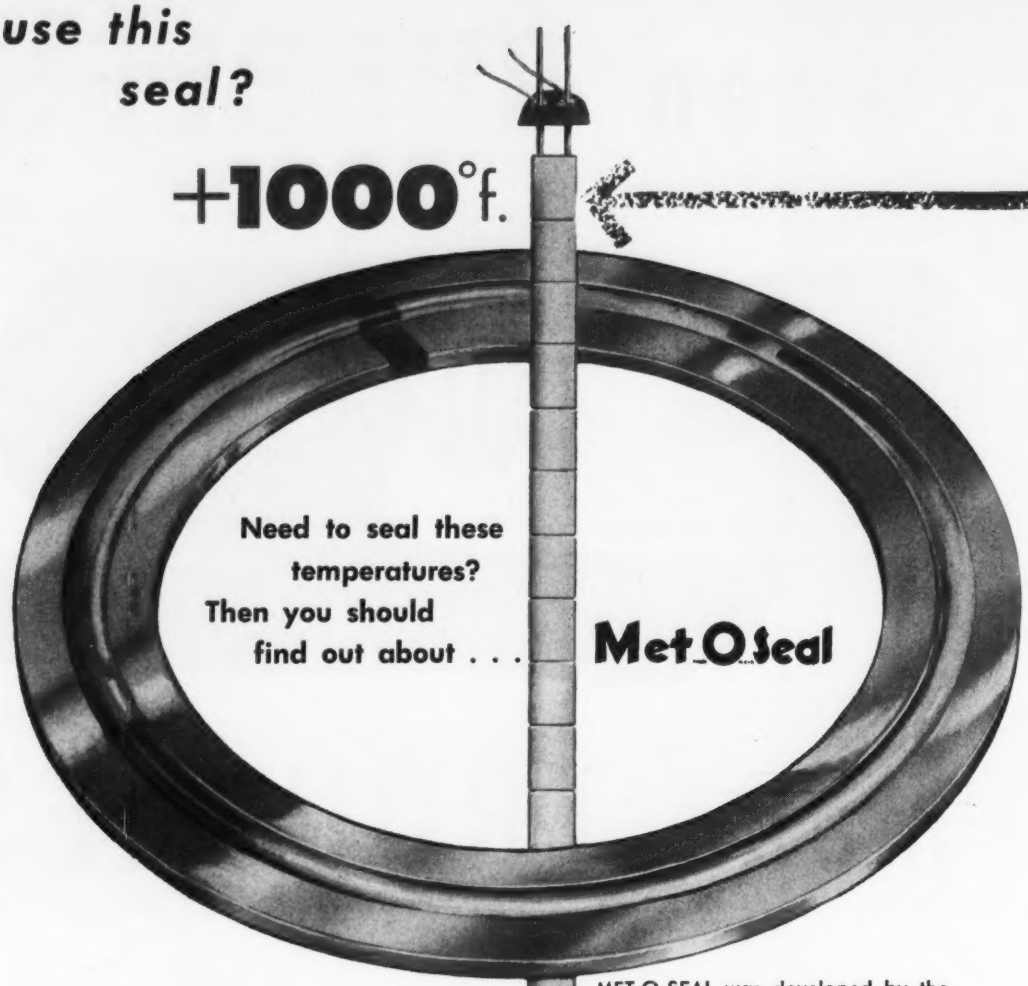
LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 3214 opposite last page.

can you use this seal?

+1000°f.



Need to seal these temperatures? Then you should find out about . . .

Met-O-Seal

MET-O-SEAL was developed by the Franklin C. Wolfe Company to provide a practical answer to *no-leakage* sealing at extreme temperatures. Here are just some of the advantages obtainable:

- Lower machining costs
- Less flange weight
- Can not blow out
- No loss of structural strength
- No leakage!

If you design in these temperature ranges why not find out about MET-O-SEAL, one of the proven members of the Gask-O-Seal Family?

New literature NOW available upon request. Write For Free Copy.

−400°f.

FRANKLIN C. WOLFE CO.

Culver City, California

"sealing design specialist"

A DIVISION OF Parker Hannifin CORPORATION
creative leader in fluid systems

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 71.

For more information on product at left, specify 3215 see information request blank opposite last page.

From page 189

To date, no maintenance has been required — a sharp contrast to $10/day spent on other units. Unit practically runs itself — it does not tie up any men with its operation.

(Dust collector is manufactured by Dracco Corp., 4080 East 116th St., Cleveland 5, Ohio.)

Check 3216 opposite last page.

Diaphragm spray nozzles for independent shut-off on manifold installation

Uses: Unit is designed primarily for manifold installations.

Features: Nozzle is equipped with manually operated shut-off assembly.

Description: Construction of the nozzle includes a diaphragm valve, shut-off screw, and wing nut. To close nozzle, shut-off screw is turned down to hold diaphragm in shut-off position. Wing nut firmly holds shut-off screw in place. When shut-off screw is set in open position, diaphragm valve functions to shut off nozzle as soon as manifold line is closed, eliminating any dripping that might otherwise occur as line pressure is reduced.

Nozzles are made in brass with internal Monel metal strainer. Wide choice of interchangeable orifice tops are available, covering considerable capacity range as well as selection of full cone, hollow cone, and flat spray patterns.

(Diaphragm spray nozzle with shut-off assembly is product of Spraying Systems Company, 3216 Randolph St., Bellwood, Illinois.)

Check 3217 opposite last page.

Money-saving valve

Bulletin of four pages cites money-saving advantages of manufacturer's gate valve for most severe 125- and 150-lb service applications. Bul 561 — The Lunkenheimer Co., Box 360, Cincinnati 14, Ohio.

Check 3218 opposite last page.

Why a Steam Trap Has to Handle "Air"

Low temperatures and corrosion of equipment are often evidence of inadequate trap air venting capacity

Air, with its load of oxygen and carbon dioxide, has an unwholesome habit of interfering with the efficiency of steam heated units. If steam were always free of these undesirable companions, things would be a lot simpler for men-who-operate-plants. Because it isn't, three unhappy situations frequently occur:

1. ***Operating temperatures are subnormal.*** This is a two-part problem. First, an air-steam mixture has a lower temperature than pure steam at the same pressure—see Table A. Secondly, air can "plate out" on heat transfer surfaces as shown in Figure 1. Under some conditions, such an air film will knock down heat transfer efficiency by as much as 50%.

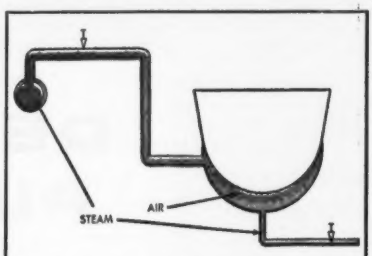


Fig. 1. *How air can "plate out" on heat transfer surfaces. This "insulation" drastically reduces heat transfer efficiency. Armstrong trap operation creates turbulence in the equipment that prevents this.*

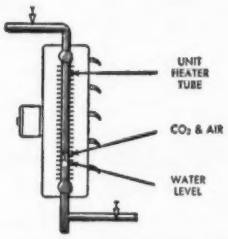


Fig. 2. *Corrosion occurs when units are not kept continuously free of both condensate and air. Armstrong traps discharge both,* at steam temperature, *as fast as they accumulate.*

2. ***Corrosion rears its ugly head.*** Oxygen and carbon dioxide are real trouble-makers. CO_2 gas goes into solution in condensate, forms carbonic acid and chews away at vulnerable metal sections. O_2 aggravates the situation. See Figure 2.

TABLE A—How air reduces steam temperature.

Gauge Pressure	Temp. of Steam with No Air Present	Temp. of Steam Mixed With Various Amounts of Air (% Air by Volume)	
		10%	30%
10.3	240.1	234.3	220.9
25.3	267.3	261.0	246.4
50.3	298.0	291.0	275.1
75.3	320.3	312.9	295.9
100.3	338.1	330.3	312.4

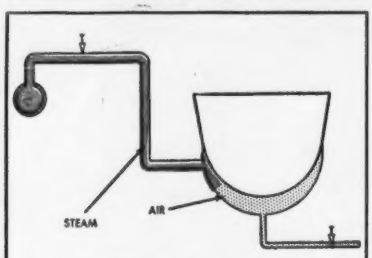


Fig. 3. *When steam is turned on, it takes a trap with extra air venting capacity to provide fast heat-up.*

3. ***Heat-up is slow as a snail.*** Air has a picnic in units that are shut off periodically. Figure 3 pictures the problem. Lines and equipment literally fill up with air. When the steam is turned on it can get in only as fast as the air gets out.

Enter Steam Traps

Curing these steam system ailments involves an operation sometimes called a "trap transplant." It consists of removing traps that don't get the air out and replacing them with traps that do.

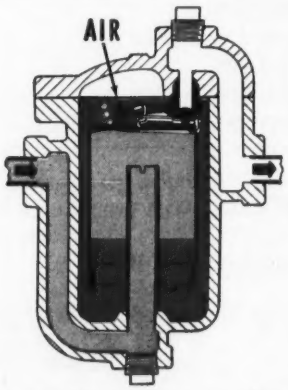
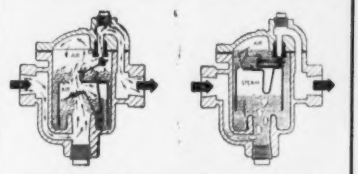


Fig. 4. *Air entering an Armstrong trap passes through the bucket vent and accumulates in the top of trap. When trap opens, air is discharged along with condensate.*

Figure 4 shows how an Armstrong inverted bucket trap continuously vents air. What the picture doesn't show is a built-in plus-value of this trap's design. An Armstrong trap opens suddenly, creating a momentary pressure drop and turbulence in the unit being drained. This breaks up air films and "pumps" air down to the trap so it can be vented.

The vents in standard Armstrong trap buckets will pass all the air normally encountered. In special cases, such as paper machine dryers, the vents are correctly sized larger at the factory to meet the requirement.



Thermostatic vent open. *Thermostatic vent closed.*

Fig. 5. *Open float with thermostatic vent for off-and-on units. When trap is cold, vent is open, permitting air to blow through when steam is turned on. When steam reaches trap, heat closes thermostatic vent. Then, regular bucket vent handles all air coming in with steam.*

Open Float with Thermostatic Vent

Super air-venting capacity is a must for fast heat-up of low pressure unit heaters, heating coils, steam headers and other units that are on-and-off. Figure 5 shows how the Armstrong open-float-with-thermostatic-vent trap takes care of this.

* * *

The 44-page Armstrong steam trap book covers other features of the Armstrong trap as well as its excellent air handling characteristics. This catalog also discusses trap selection, installation and maintenance. Your local Armstrong Representative or Distributor will be glad to give you a copy. Call him, or write Armstrong Machine Works, 8801 Maple Street, Three Rivers, Michigan.

ARMSTRONG STEAM TRAPS

Check 3219 opposite last page.

FLETCHER *TORNADO*

THE CENTRIFUGAL WITH FULL AUTOMATION

Bottom Discharge Tri-Point Centrifugal

Bottom Discharge →

CUT PRODUCTION COSTS IN HALF — The Fletcher Tornado needs no operators. It's fully automatic, gives you 24-hour production. You're certain of quality control of your product because of the uniform load and the unvarying consistency. Compare these features.

Uni-Construction—Entire centrifugal—basket, curb, drive and accessories oscillate as a unit.

Bi-Ball Swivel — Dual ball and socket on each of the three steel balancing stands assure smooth oscillation.

Tri-Point Suspension—Scientifically positioned to provide positive, effortless balance of the entire centrifugal.

Also available in manual and semi-automatic models.
F/M variable drive • Zero to maximum RPM

The New *Fletcher Works, Inc.* CENTRIFUGAL DIVISION

2nd & Glenwood Avenue • Philadelphia 40, Pa.

Send me additional information on the Fletcher Tornado Centrifugal

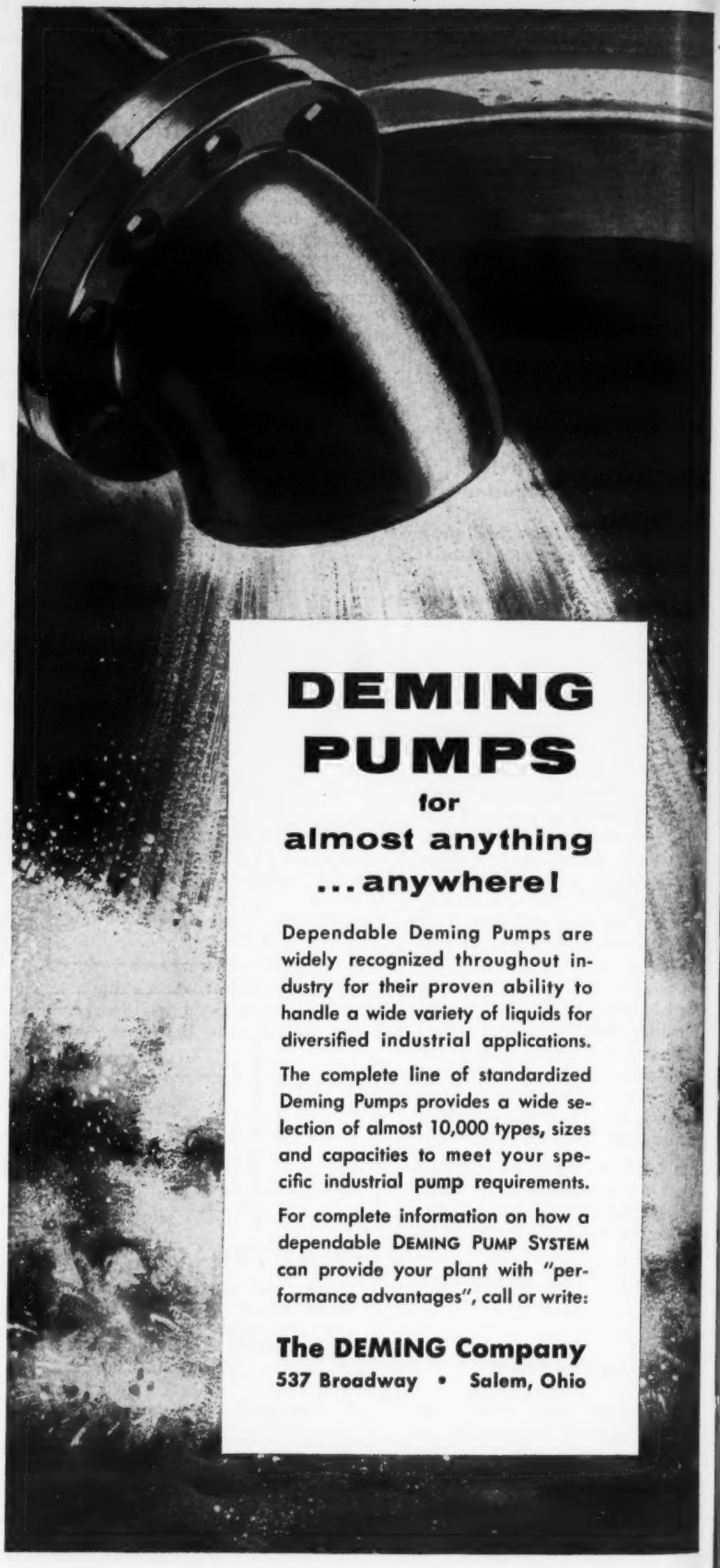
NAME & TITLE

COMPANY

ADDRESS CITY & STATE

C-1

Check 3220 opposite last page.



DEMING PUMPS

for almost anything ...anywhere!

Dependable Deming Pumps are widely recognized throughout industry for their proven ability to handle a wide variety of liquids for diversified industrial applications.

The complete line of standardized Deming Pumps provides a wide selection of almost 10,000 types, sizes and capacities to meet your specific industrial pump requirements.

For complete information on how a dependable DEMING PUMP SYSTEM can provide your plant with "performance advantages", call or write:

The DEMING Company
537 Broadway • Salem, Ohio

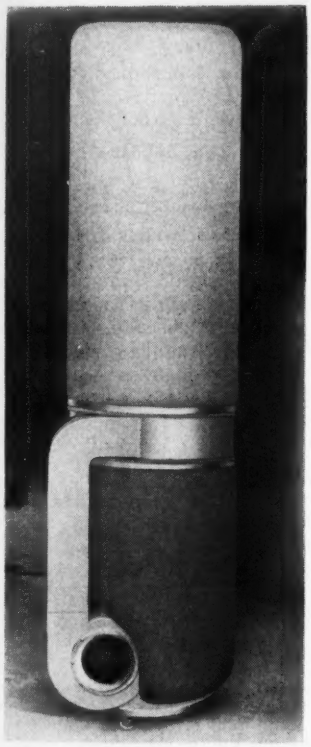
Check 3221 opposite last page.

Portable dust collector for large bulking dusts with high fines

Uses minimum floor space

Uses: For collecting dust from machines, or for general shop "vacuuming" clean-up with flexible hose equipped nozzle.

Features: Portable unit is designed to handle large bulking dusts, especially when accompanied by a great percentage of fines. Unit requires minimum of floor space.



Portable dust collector designed to handle large bulking dusts can be moved from one machine to another on short notice

Description: Portable, low-cost fabric filter-type dust collector has built-in cyclone separator to afford great reduction of dust load on filter. Collector has a 1/3-hp continuous-duty, ball-bearing motor, directly driving a paddle-wheel fan that will clear itself of chips and scraps of waste materials. Filter itself is flame-proof material of dense weave to remove dust

NO REBORING—

NO KEYSEATING—

NO MACHINING—

NO WAITING!

TAPER-LOCK SPROCKETS
SINGLE AND DOUBLE STRAND!

NOW Taper-Lock *Double* Strand Sprockets are available—from stock—ready for the shaft without re-machining!

They offer all the advantages of Taper-Lock mounting. Easy on! Easy off! Precision machined at the factory, they come to you with accurate, concentric bores—insuring full contact between hub and shaft. Taper-Lock grips with the firmness of a shrunk-on fit!

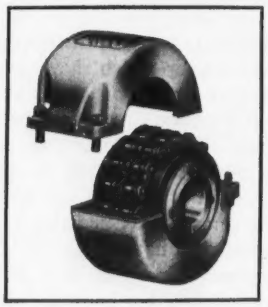
There is no flange, no collar, no protruding part. Flush design means *safety*... If the sprocket becomes worn, you replace only the tooth part. The bushing is used again and again. And Taper-Lock bushings are interchangeable in Dodge Taper-Lock Sheaves, Couplings and Conveyor Pulleys!

Taper-Lock Sprockets and Dodge Roller Chain (made to ASA standards) are stocked by Dodge distributors. Single Strand sizes range from No. 40 to No. 160, up to 112 teeth; Double Strand from No. 40-2 to 80-2, up to 102 teeth. Write for Bulletin A-644 containing selection, installation and maintenance data.

DODGE MANUFACTURING CORPORATION
6200 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.



TAPER-LOCK CHAIN COUPLINGS

Accommodates common minor shaft misalignments. Provides strong, compact coupling. Available with covers, for appearance, safety, dirt protection and lubrication—which increases coupling life.

Check 3222 opposite last page.

particles not taken out by cyclone separator.

Unit is caster-mounted for moving from one machine to another on short notice. Dust storage compartment (3½-bushel capacity) is a special tear-proof, rip-proof fabric instead of customary cumbersome can or drum. This permits easier handling, and prevents bending or breaking at sealing area to allow a leakage of dusts. Units are available with 5″-diameter inlet which rates over 600 cfm at 2″ static pressure. Floor space required is in shape of an oval and is 29 x 17″. Height is 80″ and weight is 74 lb.

(Model WWB5 Portable dust collector is product of Dustender Company, 3530 Pontiac Road, Ann Arbor, Michigan.)

Check 3223 opposite last page.

Tube steel stress data

Stress rupture data on tube steels including carbon steel, several alloy steels, and ten different stainless steels, are presented in four-page folder. Bul TDC-153B — Tubular Products Div., The Babcock & Wilcox Company, Beaver Falls, Pa.

Check 3224 opposite last page.

Alkaline boiler cleaner may be applied to operating unit

Uses: For cleaning boilers and industrial equipment.

Features: Cleaning aid is alkaline in nature, and may be applied to an operating boiler. It does not require neutralizing after cleaning.

Description: Boiler cleaning aid and supplementary treatment effectively removes high percentage of deposit. It cleans headers and other areas inaccessible to manual cleaning. Cleaner is particularly effective in dispersing calcium carbonate deposits.

(Nalco 85 is product of National Aluminate Corporation, 6216 W. 66th Pl., Chicago 38, Illinois.

Check 3225 opposite last page.

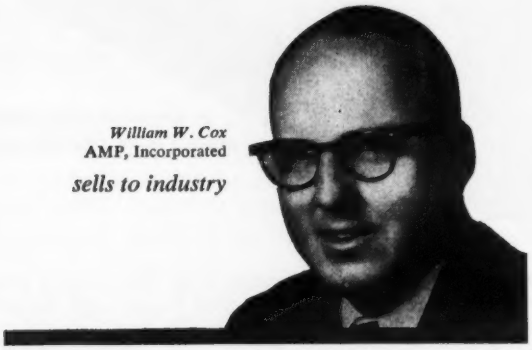
Can specialized business publication advertising actually sell?

By reputation, salesmen are reluctant to credit anything but their own selling efforts for getting names on the dotted line.

Actually, it's quite a different story. The most successful salesmen will tell you two important things about selling. 1. That the selling process is largely a matter of communicating ideas. 2. And that specialized business publication advertising can help importantly to register information with prospects.

Of course each salesman will express this in his own way . . . but they all agree that selling would be far more difficult without the advertising that appears in the industrial, trade, and professional publications that serve the specialized markets to which they sell.

Here, for instance, is what a salesman has to say about this kind of advertising:



William W. Cox
AMP, Incorporated
sells to industry

Says Mr. Cox:

"The quickest way we can introduce a product is by introducing it through advertising in business papers. That way we get it around faster than we can by word of mouth alone. On occasion my home office has inquiries out to me before I can get to the customer or prospect to introduce a new product. They've already seen it in a trade magazine.

"It's interesting to note that within the last two weeks I received a survey which shows about 80% of the new customers we get on our books come through our trade publication advertising. Of course, our company is only 15 years old and we have grown from what you might say, *nothing*, to the biggest in our business. Certainly a lot of that has come from our advertising campaigns. Our name is known throughout the world right now, purely because of our advertising program. When I go to a prospect now, they know my company, they know my product . . . it makes my job easier, and opens doors when I have to make cold calls."

Ask your own salesmen what your company's business publication advertising does for them. If their answers are generally favorable you can be sure that your business publication advertising is really helping them sell. If too many answers are negative it could well pay you to review your advertising objectives—and to make sure the publications that carry your advertising are read by the men who must be sold.

How salesmen use their companies' advertising to get more business

Here's a useful and effective package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet entitled, "How Salesmen Use Advertising in Their Selling," which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' advertising.

You'll find represented many interesting variations in how they do this. Some are very ingenious; all are effective. You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy. Then, if you decide you want to provide your salesmen with additional copies, they are available from NBP Headquarters in Washington, at twenty-five cents each. Or if you choose you can reprint the material yourself and distribute it as widely as you please. But first, send for your free copy.

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 4D
1413 K Street, N. W.
Washington 5, D. C. **STerling 3-7533**

Please send me a free copy of the NBP booklet "How Salesmen Use Advertising in Their Selling."

Name _____

Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

National Business Publications, Inc.

NBP

. . . each of which serves a specialized market in a specific industry, trade or profession.

WHAT!

NO SUBMERGED BEARINGS!

NO MECHANICAL SEALS!

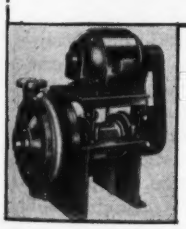
NO PACKING!

The clues to WORRY-FREE PUMPING!

WITH THE **GALIGHER ACID-PROOF SUMP PUMP**

The simple yet effective design of the Galigher Acid Proof Sump Pump eliminates the common cause of pump failure making it ideal for heavy duty corrosive service in the Chemical industry. This trouble free pump easily handles the most gritty and abrasive solutions, containing up to 60% solids and the double suction thrustless design positively will not lock air. Capacities: 10-500 G.P.M., head up to 100 ft. Available in natural or synthetic rubber, plastic covering, hard iron or stainless steel . . . direct and V-drives.

You sump it . . . we pump it!



The VACSEAL PUMP

Precision engineered for rugged use. Exclusive impeller design eliminates gland water.

LEADERS IN EXPERIENCE AND SERVICE

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EASTERN OFFICE: 921 Bergen Ave. (Room 721) Jersey City 6, New Jersey

GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication

SP-506

Check 3226 opposite last page.

BLU-LON packing

seals sulphuric, nitric and hydrochloric acids *in America's largest plants*

BLU-LON's unique manufacturing process protects this famous packing against severest acid conditions *and* against wear.

MULTI-COAT ACID PROTECTION

Each individual Blue Asbestos fibre is multicoated both before and after braiding with a pure concentrate of DuPont *Teflon*. BLU-LON is then processed by a unique Chesterton precision heat controlled process which assures the retention of all the *Teflon* and immunizes BLU-LON against deterioration from the effects of *harsh* Acids. This results in a frictionless and resilient 100% Acid Proof Packing.

By using Chesterton's Famous BLU-LON Acid Proof Packing, you will realize savings in time, labor and money. Try BLU-LON and discover why America's largest chemical plants have standardized on this leading Packing.

PACKING Chesterton SERVICE

AMERICA'S OLDEST MANUFACTURER OF MECHANICAL PACKINGS

A. W. CHESTERTON CO.

8 Ashland St., Everett 49, Mass.

☐ Please send more data on Blu-Lon acid packing used against.....

☐ Include information on White-Lon packing for strong caustics and other alkalies.

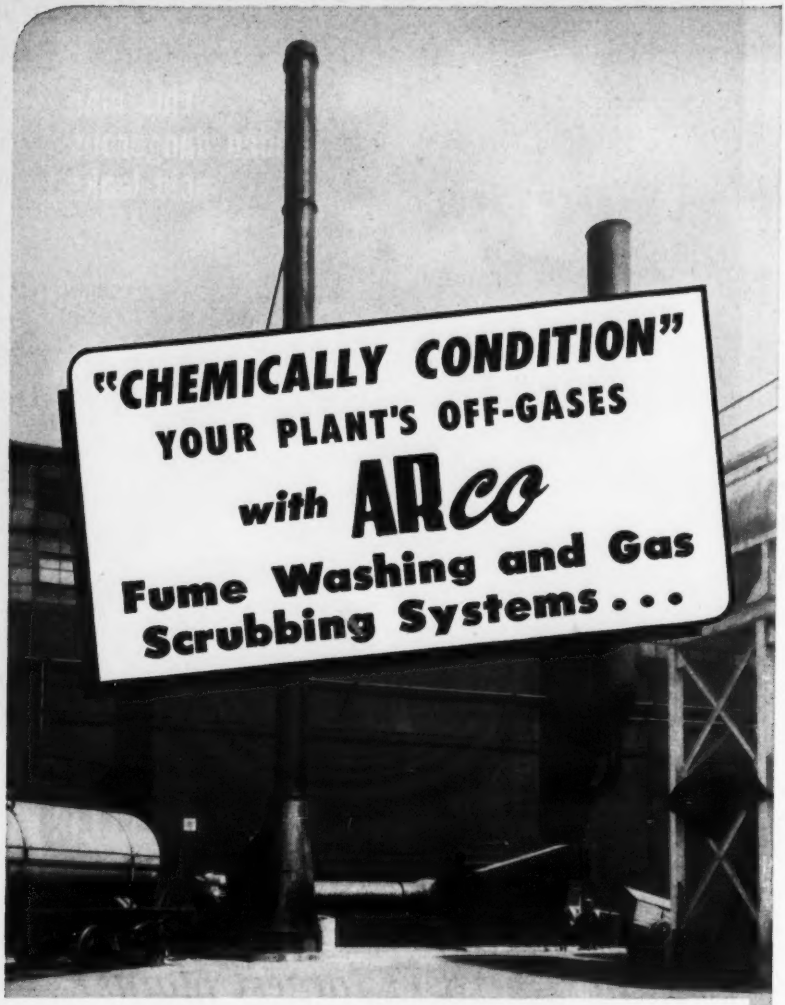
Name_____ Position_____

Company_____

Street_____

City_____ State_____

Check 3227 opposite last page.



ARco Rubber-Lined equipment and systems for all Chemical and Metallurgical operations

• ARco Rubber-Lined equipment and systems are designed to "Chemically Condition" your plant to make it safe and meet air pollution requirements in concentrated industrial areas. These systems remove corrosive fumes in plating, pickling, and metal finishing operations as well . . . Eliminate dust, fumes, and mists . . . Scrub corrosive vapors and dust particles from off-gas in smelting, refining . . . Wash recirculated plant or process air or ventilation make-up air . . . Product recovery.

Fully equipped Pilot units for on-the-job evaluation. Consult ARco Engineers on how to "Chemically Condition" your plant gases.

ARco
ANYTHING CAN BE COVERED WITH RUBBER — BY ARco

designers • engineers • manufacturers

Process Equipment Division
AUTOMOTIVE RUBBER CO., INC.

12568 Beech Rd. • Detroit 39, Mich.

Write for complete literature

Check 3228 opposite last page.

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

Industrial insulations

Series of four technical bulletins describes four industrial insulation products. Form A-400 covers Hylo pipe covering and block insulation, made from inorganic silicas. Form A-401 describes 85% magnesia insulation; and Form A-407 Tab-Loc pipe insulation made from mineral wool that's pre-formed and easy to apply. Form A-420 describes H-4 Special steam-blown mineral wool, recommended for low-temp uses.—The Eagle-Picher Co., American Building, Cincinnati 1, Ohio.

Check 3229 opposite last page.

Company profile

Products, activities, and divisions of this major chemical and construction concern are told in 32-page, pocket-size booklet. "The Company, Its Products and Activities"—Koppers Co., Inc., Pittsburgh 19, Pennsylvania.

Check 3230 opposite last page.

A case for research

Presenting a strong case for increased support of basic research in the sciences from private as well as public sources, 64-page report is divided into four parts. In addition to statistical and descriptive analysis of basic research effort in the US, the report suggests possible ways to encourage research in science. One of the ways suggested is a redefinition of the rules under which tax exemption privileges are now accorded to nonprofit research institutes. To obtain "Basic Research — A National Resource," 1957, remit 45c direct to Superintendent of Documents, United States Government Printing Office, Washington 25, D.C.

Dewatering problems?

Manufacturer's catalog describes and illustrates equipment for pressing and drying. Engineering assistance and pilot plant setup for providing data in determining economical operation of commercial-size unit are discussed. Cat C — Davenport Machine and Foundry Company, Davenport, Iowa.

Check 3192 opposite last page.

Valve sizing simplified

Bulletin of four pages containing charts covering steam, liquid and gas services, shows how to size manufacturer's sliding gate regulator valves. Cross-reference method of compiling eliminates need to use rulers or slide rules. Bul J-SC — Jordan Corporation, 6013 Wiehe Rd., Cincinnati 13, Ohio.

Check 3231 opposite last page.

Guar gum facts

Three booklets on guar gum. Booklet of 12 pages tells story of guar gum in industry — properties, uses, and actual technical applications. Second

booklet tells how to improve printing paper quality while reducing mill costs through increased production. Third, a 16-page booklet, shows use of guar gum in ore concentration. "Guartec" buls — Special Commodities Div., General Mills, Inc., 400 Second Ave. So., Minneapolis 1, Minn.

Check 3232 opposite last page.

For bulk shipping

Multi-wall aluminum foil bags offered as replacement for steel drums in bulk shipping of many industrial and chemical products are described in six-page bulletin. It is pointed out that 60 empty multi-wall foil bags, with filled capacity of 30,000 pounds, can be stored in space now occupied by one drum with only 400 pounds capacity. "Multi-wall Foil Bags" — Reynolds Metals Co., Third and Grace St., Richmond 18, Va.

Check 3233 opposite last page.

WANT MORE INFORMATION . . .

. . . about things you read about in the New Literature Section?

Here's How To Get It

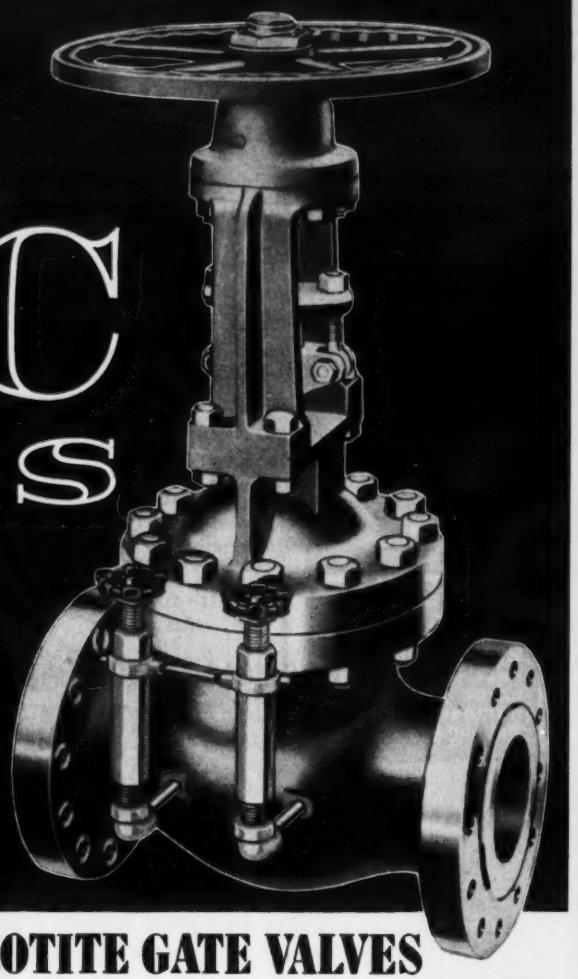
Note the number in last line of each new literature review. Check this key number on Reader Service Slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you, telling him you'd like a copy of the bulletin. He'll send it direct to you.

ACCO
for Better Values

R-P&C VALVES

THE COMPLETE LINE
—DESIGNED FOR DEPENDABILITY



R-P&C "Sure-Tight" LUBROTITE GATE VALVES

—THE MULTI-SERVICE VALVES LUBRICATED THROUGH THE SEAT RINGS

Lubrotite Gate Valves—created and patented by R-P&C—are built to provide absolute tightness and long, trouble-free service in handling all fluids for which iron and cast steel valves are serviceable.

By the unique Lubrotite system, in which each seat ring is served by a Lubrotite gun, a lubricant seal is forced through to the valve's seating surface. This lubricant prevents leakage, retards corrosion, prevents sticking, reduces wear on seating surfaces and makes for easier operation. Net result: reduced operating, maintenance and over-all valve costs!

Available in cast steel and iron types. A wide variety of lubricant seals, each suitable for numerous services, can be furnished.

Lubrotite Gate Valves are giving highly successful service in handling—

Gasoline...Oil...Benzol...HF Alkylation... other Petroleum Derivatives —

Natural and Artificial Gas...Air... Helium Gas...Coke and Gas...Water —

Vacuum Service (evaporation, etc.)... Feed Water Lines and Steam Plants —

Mine and Acid River Waters... Certain Chemicals...Other Services

Lubrotite Gate Valves form a part of the complete R-P&C line, which includes gate, globe, angle and check valves in all standard materials; all in a wide range of sizes, styles and pressure classes. Order through nearby R-P&C Distributor. Write our Reading office for catalog.

FREE WALL CHART
"How to Protect Your Valves"
Installation pointers, operating tips, clues to longer valve life. They are all on this 22" x 17" wall chart. Write for your free copy.

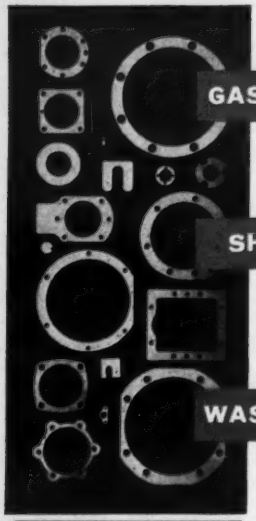
R-P&C VALVE DIVISION
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO

Check 3234 opposite last page.

No Order TOO SMALL... or TOO BIG!



With more than 50 years' accumulation of dies, chances are we can furnish the gaskets, shims, or washers you need *. . . without a die charge.* This can cut your cost and speed delivery—whether you need just a few items or large quantities. Gaskets, shims, washers or special stampings are available in metallic, non-metallic and plastics to meet your production requirements.

NOW...WIL-PAK PLASTIC SHIM STOCK with thickness identified by color and gauge number. Write for Bulletin No. 570.

Write for Catalog and prices

CHICAGO-WILCOX Mfg. Co.
7717 South Avalon Avenue
Chicago 19, Illinois

Check 3235 opposite last page.

PROBLEM: Ground-level loading, Vibradamp Corp., Jackson, Michigan. Two three-man teams and two power trucks were required for loading truck cargos and rail car shipments. As a result, loading costs were too high . . . freight movement lagged, and the men worked under hazardous conditions—manually handling huge drums of the company's asphaltic and resinous products.

SOLUTION: Now, with a Magliner Mobile Loading Ramp on the job, railcar and truck loading both are easily handled by one man and power truck, *in less than half the time formerly required!* And the *Magliner paid for itself in only six weeks!* Four men were released to other departments . . . over-all handling costs reduced.

Do you have an older building or ground-level plant . . . need extra or movable dock facilities? A Magliner Mobile Loading Ramp is the practical money-saving solution. A loading dock on wheels, where you need it . . . when you need it!

Write for Job Report LR-382 and Bulletin DB-211

MAGLINE INC., P.O. BOX 451
Pinconning, Michigan

Magliner MAGNESIUM
Mobile Loading Ramps

Canadian Factory: Magline of Canada Ltd., Renfrew, Ontario

Check 3236 opposite last page.

NEW LITERATURE

Laboratory glassware

Glassware and other instruments and equipment for the laboratory including paper electrophoresis apparatus and pH meters are covered in manufacturer's eight-page catalog. S/P November bul — Scientific Products, div. of American Hospital Supply Corp., 1210 Leon Place, Evanston, Illinois.

Check 3237 opposite last page.

Atom smasher descendent

Offered for sale or lease is traveling wave, linear, electron accelerator described in eight-page bulletin. Designed for research and for limited commercial radiation processing, the 2-10 mev, 4 kw machine is high-powered descendent of atom smashers developed at Stanford Research. Mark 1-F4 bul — Applied Radiation Corporation, Walnut Creek, California.

Check 3238 opposite last page.

Centrifugals

Manufacturer of centrifuging equipment widely used in separation, dehydration, coating, filtering, impregnation, and sedimentation processes offers booklet containing information on his equipment and its use. "Centrifugal Force" — American Tool & Machine Co., 1423 Hyde Park Ave., Boston 36, Massachusettes.

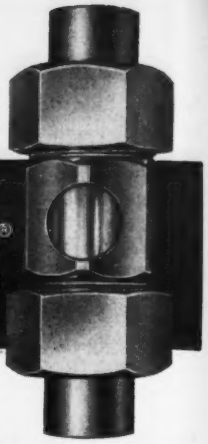
Check 2926 opposite last page.

Details unusual intermediate

32-page bulletin has 10 pages of physical and chemical properties, and describes principal reactions of cyclohexanol. Comprehensive bibliography of 266 literature references is included. Tech bul I-20 — National Aniline Div., Allied Chemical & Dye Corporation, 40 Rector St., New York 6, New York.

Check 3239 opposite last page.

Proved on Thousands of Installations!



"250" SERIES
LIQUID EYE®
POSITIVE SEALING INDICATORS
designed to save you even more time and money

DESIGN FEATURE

extension-gasket . . . ALL ONE-PIECE!
A built-in gasket that's always in place for positive sealing and foolproof assembly.

6 sizes now available: ⅜", ½", ⅝", ⅞", 1⅛" and 1⅜" O.D.S.

The "250" has all the proved Liquid Eye advantages *plus* these newly engineered features:

- **smaller—more compact, simplified design.**
- **preformed copper extension eliminates need for separate gaskets—*foolproof* installation.**
- **complete, self-contained, economy unit.**

Write today for catalog E-57 covering the complete Allin line.

Iron pipe sizes are available, with same proven design as "250" Series, in ⅛" through 1¼".

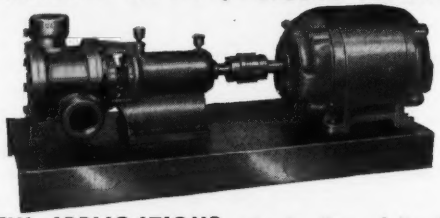
Allin
ALLIN MANUFACTURING CO.
410 N. Hermitage Ave. • Chicago 22, Illinois
Over 1,000,000 Liquid Eyes Sold to Date!

Check 3240 opposite last page.

handle those **difficult jobs**

with

AURORA® APCO *Process* PUMPS



NEW APPLICATIONS — the handling of liquefied petroleum gases, refrigerants and other light non-viscous liquids are easy for APCO Z4 Pumps.

SPECIAL METALS — APCO Z4 Pumps are obtainable in any machineable alloy. The small amount required of such metal represents a real economy.

PERFORMANCE FEATURES — of the APCO Pump are ideal for the type of process duties for which the APCO Z4 Pumps were designed.

Write for BULLETIN 111-ZA

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
62 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

Check 3241 opposite last page.

Conversion factor chart

Reference table for eingineers, shop men, etc., is available in form of handy wall chart of conversion factors. Common conversions such as inches to centimeters, or watts to hp, as well as many conversions that are difficult to locate in reference manuals, such as atmospheres to Kgs/sq cm, are included. Wall-chart of conversion factors — Precision Equipment Co., 4401 N. Ravenswood Ave., Chicago 40, Illinois.

Check 3242 opposite last page.

Clear filtering

Reported to obtain greater clarity of filtrate than other media, company's filter paper uses and features are shown and described in cat 357 — The Eaton-Dikeman Company, Mt. Holly Springs, Pa.

Check 3317 opposite last page.

Industrial radio uses

How low-power industrial radio cuts cost, improves efficiency, and helps users to increase production is shown in six-page folder. Two-way unit, specifically designed for use on gasoline- or battery-powered material handling vehicles, is fully described. Bul ECR-106B — Communication Products Dept., General Electric Co., Electronics Park, Syracuse, N. Y.

Check 3243 opposite last page.

Graphite heat exchanger

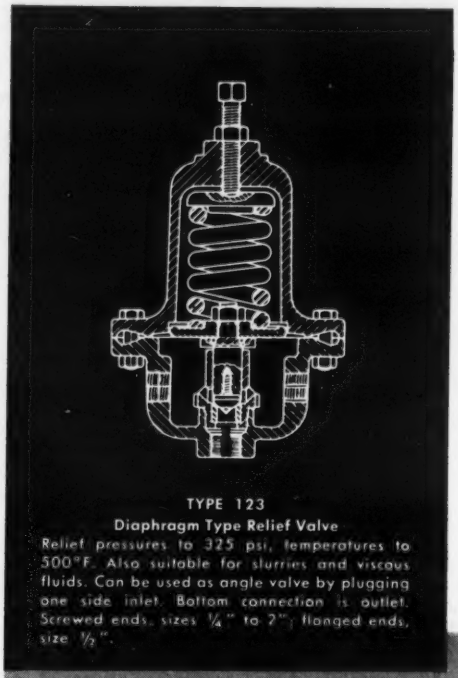
Bulletin of four pages describes manufacturer's line of carbon and graphite products for chemical processing industry, listing chemical and physical properties. Data on shell and tube heat exchangers, centrifugal pumps, entrainment separators, and other equipment are provided. Cat section S-5008 — National Carbon Co., Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 3244 opposite last page.

back pressure control problem?

CASH STANDARD

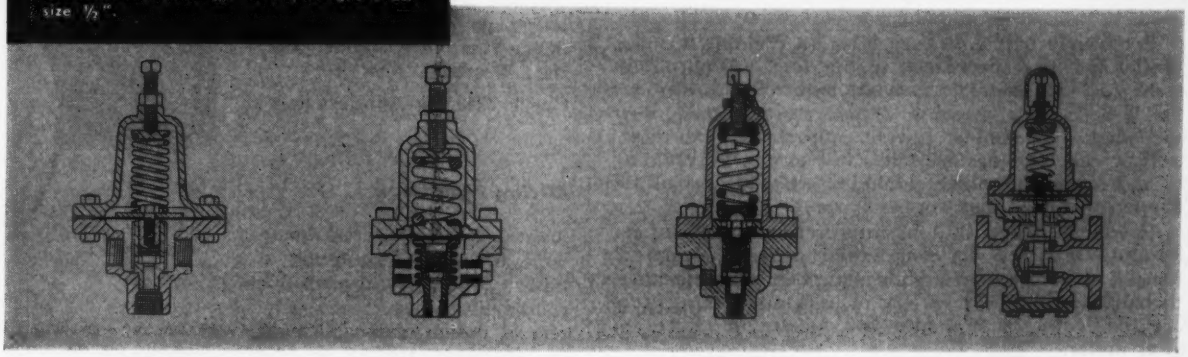
has the answer!



TYPE 123
Diaphragm Type Relief Valve
Relief pressures to 325 psi, temperatures to 500°F. Also suitable for slurries and viscous fluids. Can be used as angle valve by plugging one side inlet. Bottom connection is outlet. Screwed ends, sizes ¼" to 2"; flanged ends, size ½".

- for relief pressure ranges from vacuum to 3000 psi
- available in iron, bronze, steel, stainless steel
- for almost all liquids and gases
- sizes from ¼" to 4"
- self contained, direct operated units

Designed for any application where back pressure regulation is required. Also available in differential style to maintain differential pressure between fluids on both sides of the diaphragm.



TYPE BQ
Diaphragm Type Relief Valve
Relief pressures to 250 psi, temperatures to 450°F. A small valve especially for jobs requiring accuracy with low volume of flow. Can be used as angle valve by plugging one side inlet. Screwed ends, sizes ¼", ⅜" and ½".

TYPE 6987
High Pressure Relief Valve
Relief pressures to 1200 psi. Screwed ends, sizes ½" and ¾"; flanged ends, size ½".

TYPE 2275
Angle Type High Pressure Relief Valve
Relief pressures to 3000 psi. Side inlet, bottom outlet. Screwed ends, sizes ½", ¾", 1" and 1½".

TYPE 8311
Pressure Relief Valve
Relief pressures to 500 psi. Packless, direct operated. Single or double seat construction. Screwed ends, sizes ½" to 3"; flanged ends, sizes 1" to 4".

What's your control problem?

Consult the Cash Standard control specialist in your area for an individual solution to your control problem or write to Dept. N.

CASH CS STANDARD

A. W. Cash Co. and Its Subsidiary, Cash Standard Stacon Corp.
P. O. Box 551, Decatur, Ill.

Pressure, Hydraulic, Temperature, Process and Combustion Controls

Check 3245 opposite last page.

ROUTINE
or highly specialized...

ASME code pressure vessel

Fifty-foot jig with cross pieces placed to micrometer tolerances

Complete cathode with copper bars welded to and around steel frame

Welded steel heat exchanger with built-in expansion joint

NIAGARA CAN BUILD THE EQUIPMENT THAT'S RIGHT FOR YOUR PROCESS

Production or research, usual or unusual—whatever your needs in process equipment, you can count on Niagara.

For nearly half a century, Niagara Welding & Boiler Works Inc. has specialized in building custom equipment for the chemical process industries throughout the U. S. A. Code pressure vessels, storage tanks, heat exchangers, scrubbing towers, autoclaves and electrolytic cell cathodes are but a few examples. Welding is a Niagara specialty, including highly specialized copper-to-copper and copper-to-steel.

Resourcefulness, skill in interpreting specifications, absolute integrity on confidential projects, sound financial structure, and a shop equipped with machines to handle an endless variety of assignments . . . these are the factors that assure you maximum return for your dollar.

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Check 3246 opposite last page.

NEW LITERATURE

Container lining

Lining which offers protection to large number of hard-to-package products in steel shipping containers is described in detail in four-page leaflet. Synthetasine 300 folder — Synthetasine Protective Coatings, Inc., 600 5th Ave., New York 20, N.Y.

Check 3247 opposite last page.

Chip screening info

Manufacturer's chip screening equipment for pulp and paper mills is described and illustrated in four-page bul 705 — The Orville Simpson Company, 1230 Knowlton St., Cincinnati 23, Ohio.

Check 3248 opposite last page.

Vibrating packer uses

Features, specifications, and uses of vibrating packers having container capacities up to 350 and 500 lb are listed in four-page bulletin. Bul 63 — Ajax Flexible Coupling Co., Inc., Westfield, New York.

Check 3249 opposite last page.

O-ring handbook

Described as most complete work of its kind published to date, 160-page handbook thoroughly covers broad subject of design and application of synthetic rubber O-ring seals. O-ring handbook 5700 — write T. J. McCuistion, Rubber Products Div., Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

Processing equipment

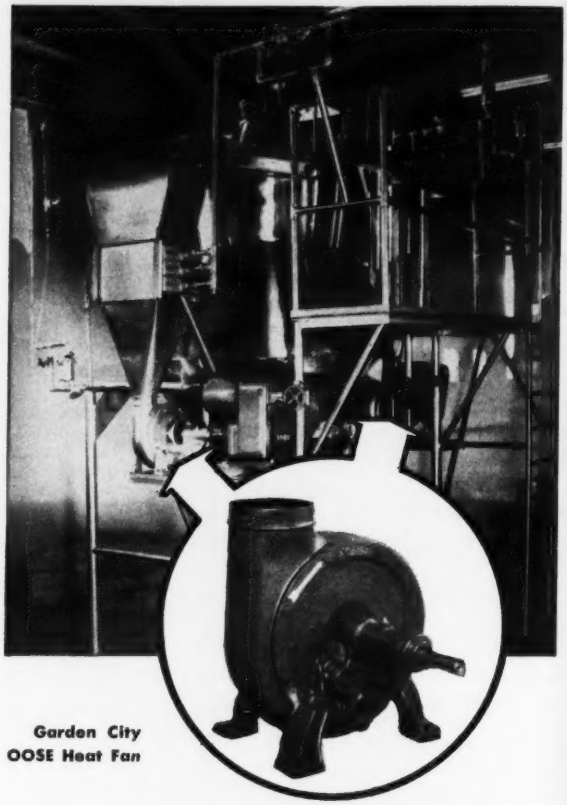
General introduction to complete line of manufacturer's processing equipment is provided by 20-page bulletin. Information on engineering, manufacturing, and research facilities is included. Bul 178 — Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 3250 opposite last page.

BLAW-KNOX* chooses

GARDEN CITY FANS

to change liquid milk into dry milk in their remarkable Instantizer!



Garden City OOSE Heat Fan

Fascinating—the way this fabulous Instantizer machine converts milk into powder form! First, the water is extracted . . . then the condensed milk-liquid is exposed to a current of hot, fast moving air (created by a Garden City OOSE heat fan) which effects immediate evaporation. Then another Garden City OOSE fan whisks away the milk powder in a conveyor.

You'll find Garden City fans in other blue-chip industries all over the nation. The advanced engineering features, remarkable efficiency level reported, and the low maintenance cost are among the many reasons why engineers are sold on Garden City.

**Dairy Equipment Division, Mora, Minnesota*

Write today for free booklet giving complete information.

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ESTABLISHED 1879

801 North 8th St.
Niles, Michigan
Dept. P

Representatives in Principal Cities

• Fans for Industry • Backward Curve • Forward Curve
• Material Handling • Radial Bladed • Small Exhaust

Check 3251 opposite last page.

Water pollution control

Recent publications on water pollution, waste treatment, and water supply have prompted 1957 revision of 108-page handbook of selected biological references on water pollution control, sewage treatment, and water treatment. To obtain Public Health Service publication No. 214, revised 1957, remit 45c direct to Superintendent of Documents, United States Government Printing Office, Washington 25, D.C.

Efficient dust collector

Manufacturer offers four-page reprint of technical article covering two-stage, cyclone-and-precipitator dust collection system which is 98.5% efficient. Installation is described, and operation of each unit, plus system tie-in with production process, are explained. Dust collector reprint — Buell Engineering Company, Inc., 70 Pine St., New York, N. Y.

Check 3252 opposite last page.

Desuperheater details

Change in manufacturer's desuperheater design is described and illustrated in four-page bulletin. Clear schematics help outline working principle of advanced thermodynamic design. Complete specifications are included. Bul 1037 — Copes-Vulcan Div., Blaw-Knox Co., Erie 4, Pa.

Check 3253 opposite last page.

Hydride reactions

Folder of four pages outlines how any company can profit from application of hydride and other unique reactions without adding to overhead, tying up existing facilities, or altering established production techniques. "Custom Reaction Service" — Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.

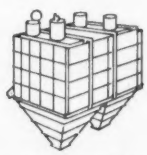
Check 3254 opposite last page.

Buell Combination Cyclone-Precipitator installation at cement plant.

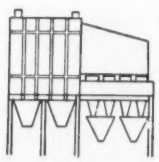
"Paid for itself!"

In nearly all cases, Buell dust or fume collection systems pay for themselves in just a few years. Buell "SF" Electric Precipitators provide extra collection efficiency *and* lower maintenance costs year after year, thanks to features like the exclusive high-emission, self-tensioning Spiral-ectrodes and unique Continuous Cycle Rapping. For specific information about dust collection efficiency and all three Buell systems, write for a copy of the booklet, "The Collection and Recovery of Industrial Dusts." Dept. 11-A, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

BUELL CYCLONE



"SF" ELECTRIC PRECIPITATOR



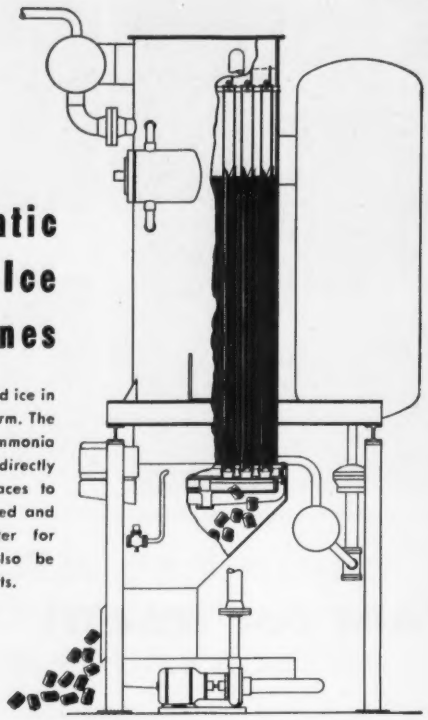
PRECIPITATOR-CYCLONE COMBINATION

buell®

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

Check 3255 opposite last page.

GET AHEAD with . . ."YEARS-AHEAD". . .



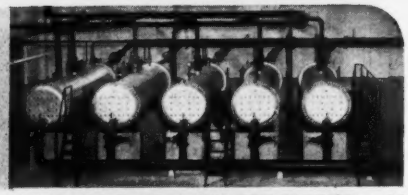
Automatic Tube-Ice Machines

Make clear, hard, sized ice in cylinder or crushed form. The refrigerant, either Ammonia or Freon, is applied directly to the freezing surfaces to produce ice with speed and economy. Cold water for process work can also be supplied by these units.

ICE MAKING and REFRIGERATING EQUIPMENT

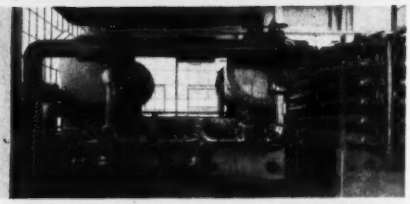
Refrigeration Condensers

Available in horizontal multipass shell and tube types and vertical single pass types for Ammonia or Freon refrigerants. Special metals, lined tubes, etc. can be furnished for unusual operating conditions.



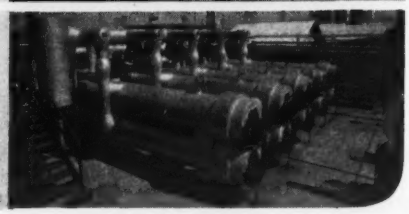
Brine Coolers

Multipass type brine coolers are ideal for closed brine systems in cold storage plants, dairies, packing plants, petroleum refineries, etc. requiring units of large capacity. Also suitable for cooling non-corrosive liquids in general.



Scraped Surface Exchangers

Continuously revolving scrapers sweep heat transfer surfaces clean and keep solids in suspension. Useful in problems of heat transfer with crystallization with high viscosity, or with solvent extraction. Available in double pipe and shell and pipe construction.



HENRY VOGT MACHINE CO., Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati

OTHER VOGT PRODUCTS ▶ DROP FORGED STEEL VALVES, FITTINGS AND FLANGES IN A COMPLETE RANGE OF SIZES • PETROLEUM REFINERY AND CHEMICAL PLANT EQUIPMENT • STEAM GENERATORS

Check 3256 opposite last page.

NEW LITERATURE

Enzyme starch conversion

Bulletin of two pages describes manufacturer's system for enzyme starch conversion and lists benefits obtained with this equipment. Bul V-1221 — Norcross Corporation, 247 Newtonville Avenue, Newton 58, Massachusetts.

Check 3257 opposite last page.

Diaphragm pump info

Capacities, construction, and advantages of diaphragm pump for precision metering and proportioning of fluids are covered in bul 301 — Hills-McCanna Company, 2345 W. Nelson St., Chicago 18, Ill.

Check 2899 opposite last page.

Corrosion-proofing data

Contracting facilities for corrosion-proof construction made available by materials manufacturer are reviewed in four-page bulletin. In addition to resume of integrated services, photographs of various corrosion-proof installations are included. Bul C-1 — The Atlas Mineral Products Co., Mertztown, Pa.

Check 3258 opposite last page.

Magnetic motor starters

Bulletin of 20 pages contains comprehensive data on manufacturer's NEMA Size O and 1 magnetic motor starters for such applications as pumps, blowers, fans, mixers, and compressors. Bul GEA-6611— General Electric Co., Schenectady 5, New York.

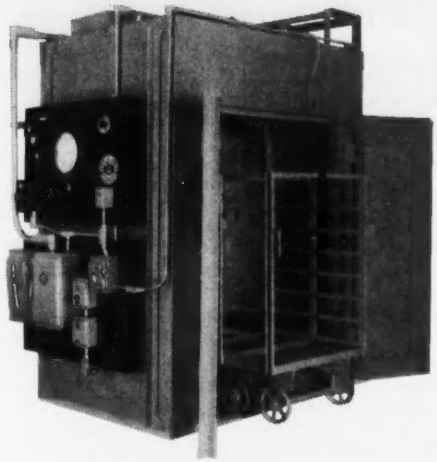
Check 3259 opposite last page.

Isobutyronitrile

Six-page data book gives properties and applications of isobutyronitrile, a reactive intermediate. TDR # N-102 — Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., Kingsport, Tenn.

Check 3260 opposite last page.

Completely Controlled for Drying Quality and Safety



No matter what the chemical nature or sensitivity of material to dry, in Rockwell Recirculating Ovens you are sure of complete product uniformity, with complete operating safety.

Standard cabinet and truck type ovens (gas, electric or steam) are available with aluminized steel interiors or with special stainless steel; fume-tight; recirculating fans are interlocked with heating system for shut-off in event of power or fuel supply failure; other safety features.

For drying, baking, curing, evaporating or finishing, Rockwell Ovens are RIGHT for you. What's your heat processing problem?

Write for Bulletins 125 & 126

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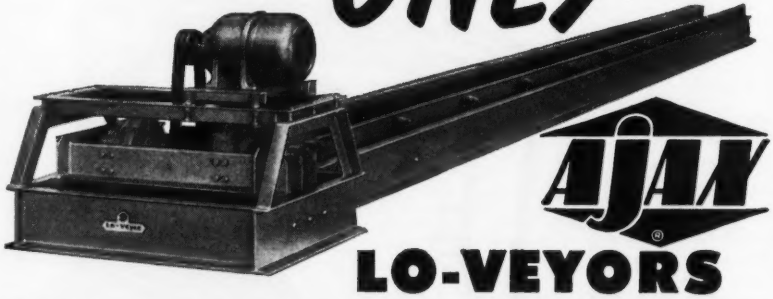
Sales Representatives in Principal Cities

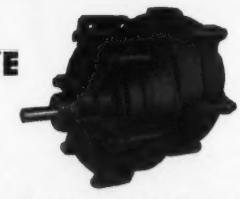
Check 3261 opposite last page.

ONLY AJAX LO-VEYORS



GIVE YOU THE LOW COST PERFORMANCE MADE POSSIBLE BY THE AJAX RECIPROCATING DRIVE

Ajax Lo-Veyor performance is built around its exclusive reciprocating drive. It is a self-contained unit housing two gear driven weights rotating in opposite directions, which impart reciprocating action in automatic balance. The drive mechanism runs on anti-friction bearings in an oil tight housing — which keeps lubrication in and abrasive dirt out. Lo-Veyors are available in open and closed pan or tubular types. Write for catalog.



Showing Ajax Reciprocating Drive Unit. Smooth operation permits installation without heavy anchorage to building.

AJAX FLEXIBLE COUPLING CO. INC.

WESTFIELD, N. Y.

Check 3262 opposite last page.

NEW LITERATURE

'One man crew'

Manufacturer's "one man crew" material handling system is completely described in eight-page bulletin. How system works and can be utilized, as well as its advantages, are covered. Type of equipment required is also discussed. Application Analysis-153 — Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Massachusetts.

Check 3263 opposite last page.

Lab equipment listed

Among items illustrated and described in 16-page catalog are burettes with automatic zero, featuring Teflon plug and bushing, paraffin dispenser, powerstats, Teflon beakers, and many other pieces of laboratory equipment. "What's New for the Laboratory" — Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.

Check 3264 opposite last page.

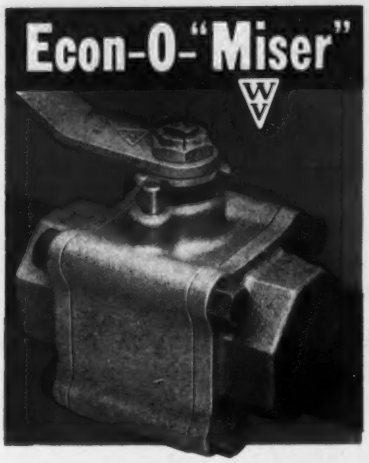
Hycar rubber

Within the 24 pages of this technical brochure are ten charts and seven detailed tables. Along with text, they compare the effects and properties of Hycar rubbers, blends and vulcanizates used both alone and with textiles, paper, and sheeting. Bul #657 — B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio.

Check 3265 opposite last page.

". . . Wait a minute . . . You forgot your slide rule!"

Econ-O-"Miser"



Worcester's New Econ-O-"Miser" Ball Valve* is BOTH VALVE and UNION

The costs of a union and installing it are eliminated. Add to this the longer operating life of the Econ-O-"Miser", the time and materials savings of *in-line maintenance,* and you get performance unmatched by *any* valve at *any* price.

The Econ-O-"Miser" is available in Bronze, Aluminum, Aluminum Bronze, Forged Carbon Steel, types 303 and 316 Stainless Steel. Seat and seal materials available: Teflon, Buna-N and Neoprene (others available on request.)

The many combinations of body and seat seal materials allow handling of exceptionally wide range of media.

Other Outstanding Features

- Compact for ease of installation
- Positive leakproof shut-off
- **In-line maintenance** permits quick, easy inexpensive repairs
- Two-way flow allows application of pressure or vacuum to either side of valve
- Quarter turn operation — readily adaptable to remote control
- Visual determination of OPEN — CLOSED positions — No manual check needed
- Round flow through the valve — minimum pressure loss and turbulence
- "Wiper-action" of resilient seat against ball eliminates abrasive wear due to foreign materials in media . . . assures leak-proof seal . . . long operating life

* Pat. Pending

Write for full particulars

WORCESTER VALVE CO., Inc.

18 Parker Street, Worcester, Mass.

Check 3266 opposite last page.

Specialized
Die-Cutting and Gaskets

- More than 35 years experience in die-cutting non-metallic materials.
- We are equipped to slit rubber slabs up to 12" thick — or, to die-cut materials as thin as .001" onion skin shim paper.
- Difficult adhesive coated, or impregnated materials are easily handled through our unique cutting process.
- Materials handled and stocked include paper, asbestos, fibre, rubber, cork, felt, synthetics and many miscellaneous materials.
- All steel rule dies are made in our own plant.

Ask about our technical and consulting service.

Rhopac, Inc.

3439 Cleveland Street, Skokie, Illinois

Manufacturers of mechanical packings, industrial and boiler gaskets, radio speaker gaskets, steel rule dies, flexible packing hooks.

Check 3267 opposite last page.

1 MAN + 1 BENDER

- Wrenchless, ready to use.
- Practical, quickly set up.
- Adaptable, replaces special equipment.
- Versatile, 141 different dies available.
- Dependable, a must for maintenance, limited production.
- Invaluable, optional equipment makes jobs easier.

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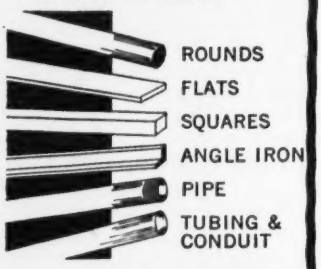
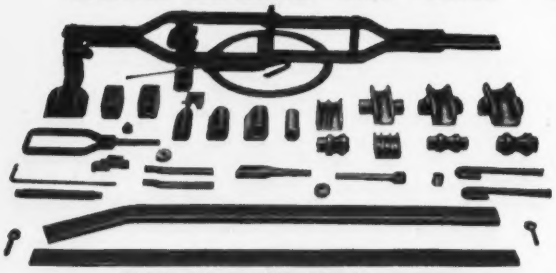


HOSSFELD *UNIVERSAL®* IRON BENDER



BENDER SHOWN WITH REGULAR EQUIPMENT

FREE: WRITE FOR BULLETIN — HOSSFELD MFG. CO. 450 W. THIRD STREET, WINONA, MINNESOTA

Check 3268 opposite last page.

NEW LITERATURE

Story of chemicals

The story of a chemical manufacturer — how you and I use his products, and on-the-spot photographs of how these inorganic and organic chemicals are made — is presented in 32-page, digest-size booklet, "The Story of Diamond Chemicals" — Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

Check 3269 opposite last page.

Teflon packings

Features, uses, and properties of Teflon packings are detailed in manufacturer's cat AD 131 — The Garlock Packing Company, Palmyra, New York.

Check 2921 opposite last page.

Describes 'Bunsen' burner

Electrothermal "Bunsen" burner, indispensable source of heat for numerous applications in the laboratory, is described in two-page newsletter. Equipment is illustrated and specifications listed. News Letter Vol 4, No 34 — Gardner Laboratory, Inc., PO Box 5728, Bethesda 14, Md.

Check 3270 opposite last page.

Acrylic paint data

Brochure of 70 pages summarizes company's findings in an extensive "every-climate" test program on Rhoplex AC-33 for acrylic emulsion paints. "Progress Report Four" — Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.

Check 3271 opposite last page.

Aluminum grating, treads

Two four-page bulletins describe in detail manufacturer's rectangular, riveted, aluminum grating and various types of metal grating and stair treads. Forms 989-557 and 1111-C-657 — Klemp Metal Grating Corporation, 6631 South Melvina Ave., Chicago 38, Illinois.

Check 3272 opposite last page.

Jobs for plastisols become BIGGER!

Photo courtesy Kaybar, Inc.,

Interior of this large fume scrubber was sprayed with Unichrome Plastisol. The thick vinyl coating withstands acids, alkalies, and many other corrosives. Being pore-free and seamless, the Unichrome Plastisol lining is now preferred for many jobs where rubber or plastic sheet linings were used formerly.

Note that sheer size is no longer a hindrance in applying plastisols. Firms with ever-expanding facilities are located at key points and can handle big jobs economically, quickly.

Plastisols conform to irregular surfaces without air pockets. The coatings stick tight, have good flexibility to absorb mechanical shock, resist abrasion.

Send for bulletins — or name of nearest applicator of Unichrome Plastisols.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
WELDING SUPPLIES
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HEAVY MELTING SCRAP

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Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit–United Chromium of Canada, Limited, Rexdale, Ont.

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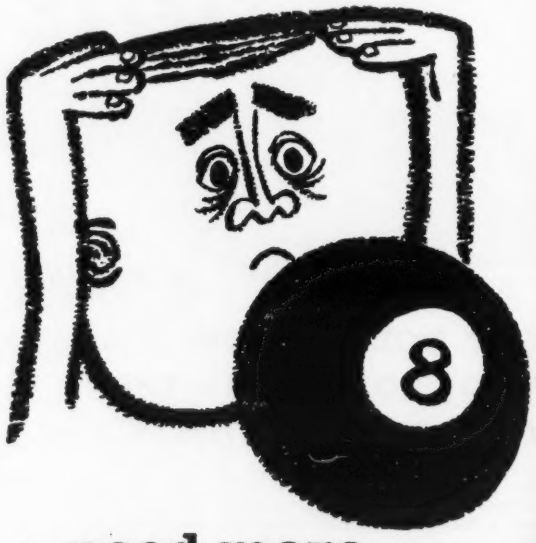


need more information . . .

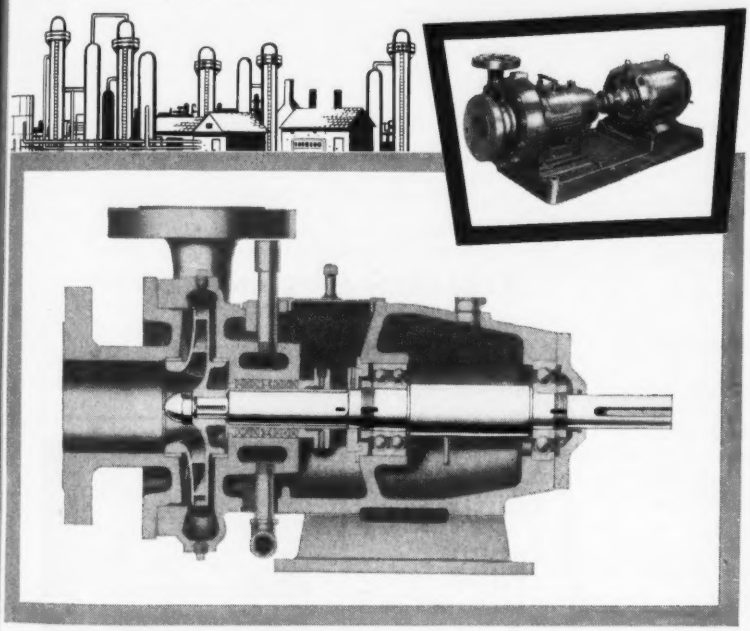
Note there is a key number at the end of editorial articles or advertisements. To request more information check the proper number on the convenient form opposite the last page. Send the form to us . . . we do the rest. Information comes direct to you. No obligation, of course.

HOW! PUMP USERS!

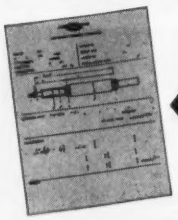
Low Shaft Deflection Means Less Down Time

★ Reduce packing and bearing problems with Dean Brothers centrifugal pumps which are engineered for top performance at 3500 RPM.

Large shaft diameters with short overhang minimize deflection, reduce packing wear and avoid metal-to-metal contact within pump at close running clearances.



★ Low shaft deflection is a must for satisfactory mechanical seal operation. Dean Brothers seals are manufactured to their own specifications. Both pumps and seals are designed for mechanical reliability.



The Best is our Standard

Calculation forms which will aid process engineers in determining pump shaft deflection are available from Dean Brothers Pumps on request.

DEAN BROTHERS PUMPS INC.

EST. 1869

323 West 10th St., Indianapolis 7, Ind.

EXPORT OFFICE: 50 CHURCH ST., NEW YORK 7, N.Y. • CABLE ADDRESS--*BROSITES NEWYORK*

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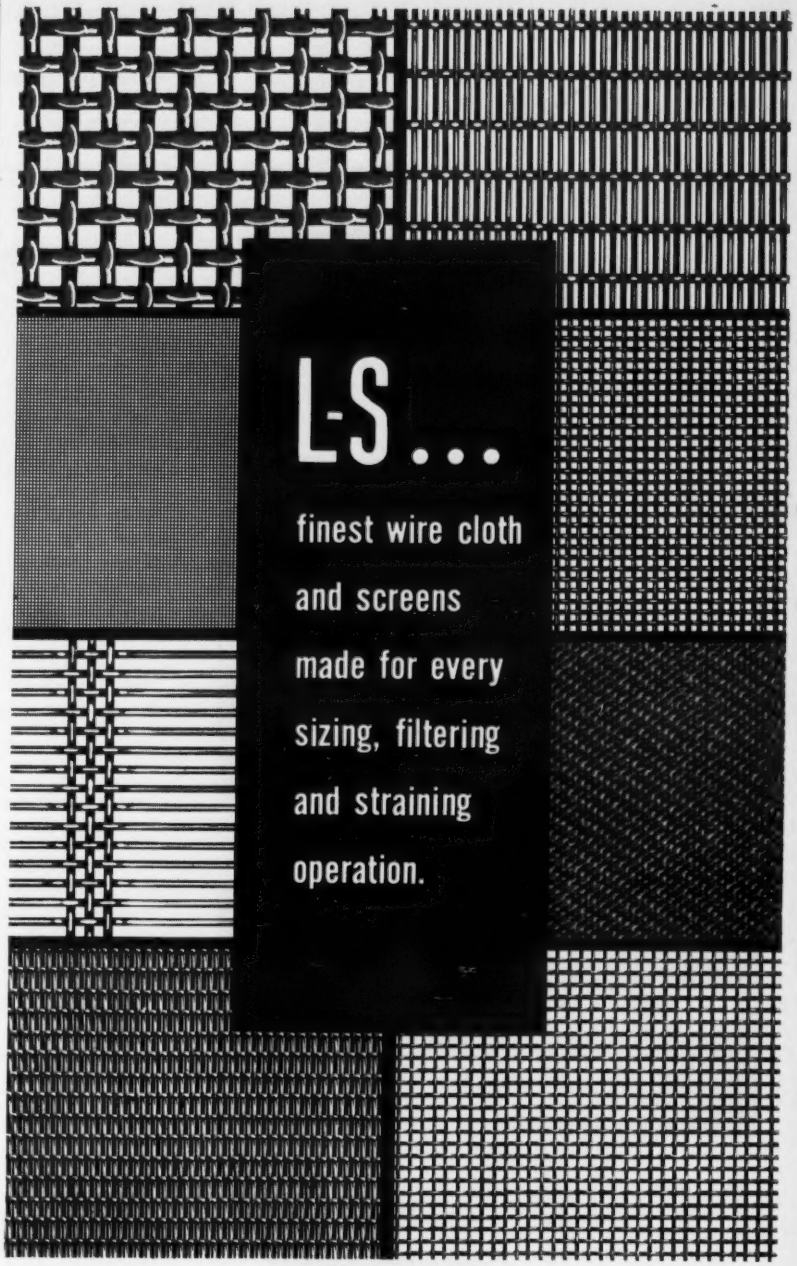

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finest wire cloth and screens made for every sizing, filtering and straining operation.

Ludlow-Saylor Wire Cloth and Screens can be furnished in stainless, monel, bronze, brass, copper, oil-tempered, high-carbon, or any other metal that can be made into wire.

Whether your requirements can be met by one of the hundreds of weaves carried in stock—or one precision woven from special alloys exactly to your specifications—L-S Wire Cloth or Screens have proved far superior in resisting abrasion, corrosion, high pressure, vibration and heat. Specify L-S as a guarantee of better product uniformity and quality.

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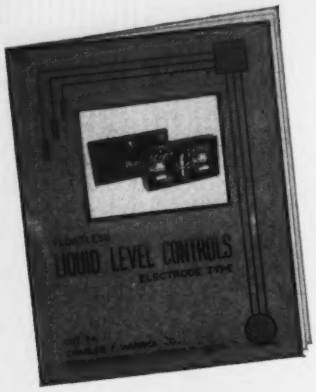
SALES OFFICES: Birmingham, 1727-6th Ave. N.; Chicago, 5708 W. Diversey; Pittsburgh, Union Trust Bldg.; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St. WEST COAST SUBSIDIARY: Los Angeles, Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road.

Check 3275 opposite last page.



Write For 32 Page Catalog

- Pump Controls
- Duplex Pump Alternators
- High and Low Level Cutoffs
- High and Low Level Alarms
- Multi-level Signals
- Liquid Metering
- Special Controls and Panels

Listed by Underwriters Laboratories

CHARLES F. WARRICK CO.

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Warrick

FLOATLESS
LIQUID LEVEL CONTROLS
ELECTRODE TYPE

Check 3276 opposite last page.

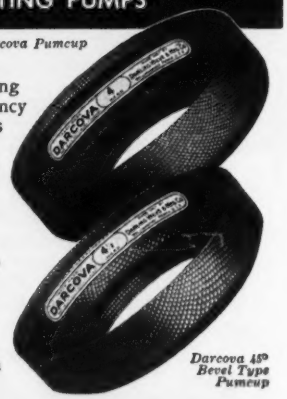
DARCOVA PUMCUPS
now available with
100% NYLON COMPOSITION
for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup

DARCOVA PUMCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5503.



Darcova 45° Bevel Type Pumcup

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA
TRADE MARK
PUMCUPS

Check 3277 opposite last page.

NEW LITERATURE

Slurry pump bulletin

Manufacturer's bulletin describes diaphragm slurry pump capable of handling materials ranging from clear liquids to slurries containing up to 60% abrasive solids. Bulletin shows how problem pumping applications are handled, and covers features and specifications. Bul 5003 — Dorr-Oliver Incorporated, Stamford, Conn.

Check 2917 opposite last page.

Sheet packing catalog

Sheet packing for handling liquids, gases, and abrasives is described in four-page catalog. Uses and specifications are included. Sheet Packing Catalog — B. F. Goodrich Industrial Products Co., Akron, Ohio.

Check 3278 opposite last page.

Size reduction equipment

Manufacturer of grinding and mixing equipment presents six-page bulletin which illustrates and describes mills, mixers, breakers, blenders, and dryers. Features and specifications are listed. Size reduction equipment bul — Paul O. Abbe, Inc., 141 Center Ave., Little Falls, N. J.

Check 3279 opposite last page.

High-vacuum gage info

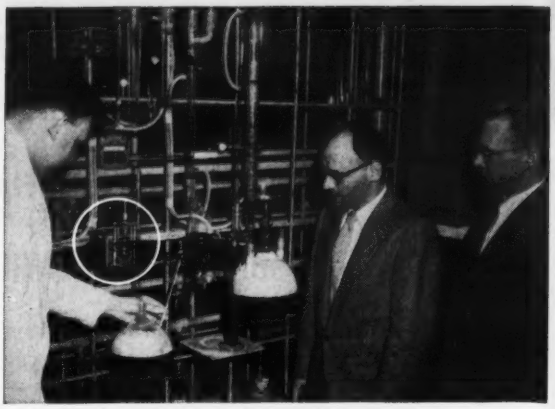
Manufacturer's bulletin of 24 pages presents features and specifications on line of high-vacuum gages. Bul 9-1 — Rochester Div., Consolidated Electrodynamics, Rochester 3, New York.

Check 3280 opposite last page.

Thrifty mixer

Manufacturer's bulletin details portable mixer said to provide thrifty answer to many liquid-mixing problems. Bul 520-C — Eastern Industries, Inc., Regent St., E. Norwalk, Conn.

Check 3132 opposite last page.



CORSON-CERVENY MICRO BELLOWS PUMP Meters Sodium Chlorate in Improved Mathieson ClO_2 Process

In the development of this process (which may effect a savings as high as $8000 a year per ton day of gas produced) the Corson-Cerveny Micro Bellows Pump was used to meter sodium chlorate into the laboratory scale generator.

This is but one of many diversified jobs the Micro-Bellows Pump does in research and development laboratories, especially where highly corrosive chemicals are pumped . . . because all parts of the pump in contact with the liquids are made of corrosion-resistant stainless steel.

Write for complete information, and for bulletins on other types of specialized laboratory testing equipment.

RESEARCH APPLIANCE CO.
BOX 307, ALLISON PARK, PA.

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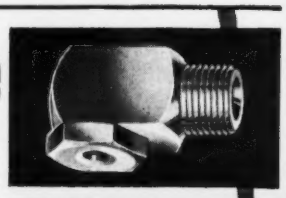
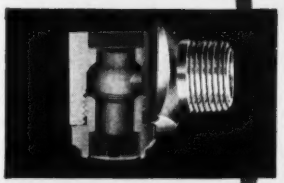
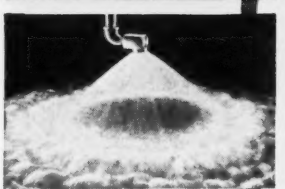
Spray Nozzle types
choice of over 12,000 basic designs



materials
brass, stainless steel, lead, hard rubber, hardened steel, tungsten carbide and many others.



performance
uniform distribution with spray angle, capacity, impact and atomization to your specifications.



to improve every spraying operation

Improve performance, lower spraying costs with Spraying Systems spray nozzles. Prompt delivery. For complete information write for Catalog 24.

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3216 RANDOLPH ST. • BELLWOOD, ILL.
ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

Check 3282 opposite last page.

Tech books, journals

Publisher's 1958 catalog of scientific and technical books and journals contains over 104 pages and more than 700 listings. Complete author and subject index is included covering fields of chemistry, mathematics, physics, engineering, etc., 1958 cat — Scientific and Technical Books and Journals — Interscience Publishers, Inc., 250 Fifth Ave., New York 1, New York.

Check 3283 opposite last page.

Lists industrial chemicals

Bulletin of 12 pages, indexed for ready reference, contains complete listing of manufacturer's commercial-quantity chemicals. Description, properties, and uses of each product are included. Bul 100-A — Hooker Electrochemical Company, 711-2 Forty-seventh St., Niagara Falls, New York.

Check 3027 opposite last page.

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. . . about things you read about in the New Literature Section?

Here's How To Get It

Note the number in last line of each new literature review. Check this key number on Reader Service slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

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new STRONG

ductile iron steam traps give you cast steel service at less than half the price!*

Strong's new 540 Series Hydro-Flex Steam Traps are made of DUCTILE (NODULAR) Iron that can be bent or twisted without breaking. This newest metallurgical development, adopted by ASME*, enables Strong to produce traps for service up to 500 psi and 650°F with ample safety factor. Ductile Iron economy permits sale of these traps at less than half the price of comparable cast steel traps.

Here are six reasons—besides low cost—why you should specify and use Strong Ductile Iron Steam Traps:

1. Safer to use because Ductile Iron body and cover will bend or twist in case of explosion or fire whereas brittle materials might shatter or break.

2. Especially recommended for drainage and drip service on high pressure steam systems and on both high and low pressure systems in chemical plants and refineries where steel is normally required.

3. Wide choice of sizes and capacities: Pipe sizes from ½" to 2", capacities to 42,800 pounds of water per hour.

4. Easy to install: Traps furnished with either screwed or socket weld connections . . . can be welded to carbon steel, stainless steel or nickel . . . can also be brazed or gas welded.

5. Features famous "Hydro-Flex" inverted bucket trap action with only two moving parts for high discharge capacity and unmatched performance on light loads.

6. All stainless steel internal parts . . . screwed-in renewable valve and seat of wear resistant ANUM-METL, guaranteed leakproof for one year.

*Ductile (Nodular) Iron meets the requirements of the ASME Code for use in vessels at pressures to 1000 psi and temperatures to 650°F (80% of cast steel service).

Strong 540 Series Ductile Iron Traps are available from your local Strong Distributor. Call him for more information, or contact . . .

Ductile Iron Steam Traps are produced in five sizes for pressures to 500 psi, temperatures to 650°F. Pipe sizes range from ½" to 2", capacities to 42,800 lbs of water per hour. Type "M" Vacuum and Lifting Traps also made of Ductile Iron.

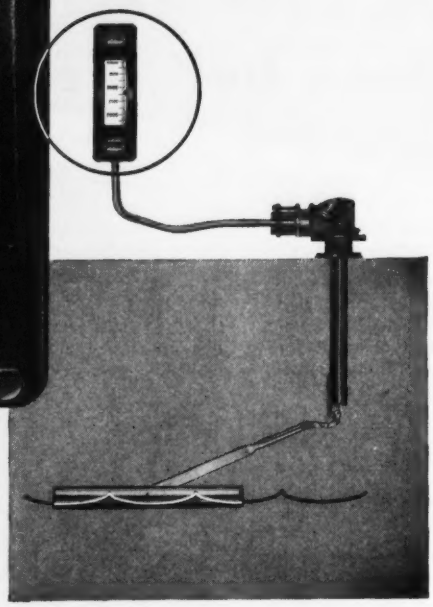
STRONG, CARLISLE & HAMMOND

1392 WEST 3rd STREET • CLEVELAND 13, OHIO

air traps • strainers • reducing valves • vacuum or pumping traps

Check 3284 opposite last page.

NEW LIQUIDOMETER INDICATOR



SAVES SPACE ON INDUSTRIAL CONTROL PANELS

Twenty-inch dial in 3x10¼" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

Teamed with Liquidometer's time-tested hydraulic transmission gaging system, the new indicator provides instantaneous remote indication of liquid levels—automatically. No outside power source is required. Virtually any liquid may be measured, and the indicator can be located up to 250 feet from the tank.

Engineered for dependability, the Liquidometer gaging systems highlight these design features:

- Maintenance free
- Integral temperature compensation
- Ease of installation—requires only one 2" diameter tank opening
- Safety—all gages Underwriters approved for hazardous liquids

For further details on the new Model 216 Indicator, write Dept. D.

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36th STREET
LONG ISLAND CITY 1, NEW YORK

Check 3285 opposite last page.

Profits leaking away?

Where there's valve leak there's a profit leak, according to manufacturer of diaphragm valves for liquids, gas, corrosive services, slurries, air, and water. Valves are described in bul 104 — Hills-McCanna Company, 2345 W. Nelson St., Chicago 18, Ill.

Check 2899 opposite last page.

Synthetic resins for rubber

Series of resins developed specifically for use in rubber compounding and in adhesives is described in 32-page technical manual. Properties and applications of liquid and powdered phenolics, terpene phenolics, polyterpenes, and resorcinols are covered in detail. "Resins for the Rubber Industry" — Schenectady Resins Div., Schenectady Varnish Co., Inc., Schenectady 1, New York.

Check 3285A opposite last pg.

Heat-treating facilities

Facilities for heat-treating metals at the Army's Watertown Arsenal Laboratories, said to be the most modern in the country, are described in 29-page report. To obtain report PB 131116, "Construction and Characteristics of Heat-Treating Facilities at Watertown Arsenal Laboratories," remit 75c direct to Office of Technical Services, United States Dept. of Commerce, Washington 25, D.C.

Emergency showers

Not recommended for a Saturday bath but valuable for decontamination purposes, manufacturer's emergency shower equipment is illustrated and described in 12-page bulletin. Additional bulletin of six pages covers equipment for emergency eye, nose, and mouth decontamination. Buls 48 and 49 — Logan Emergency Showers, Inc., Glendale, Calif.

Check 3286 opposite last page.

HOW TO PICK A COLLOID MILL

QV-6-1 Laboratory Model has ½ HP universal motor with 5 gal. stainless steel jacketed hopper or pressure head for direct feed.

VT-11 Production Model has 15 or 20 HP motor with 20 gal. stainless steel jacketed hopper.

Picking the proper colloid mill—for the best possible results in grinding, emulsifying and homogenizing—isn't always easy. For most colloid mills are "look-alikes"—on the *outside*.

But if you stripped a *G-W Eppenbach Colloid Mill* down, you'd see fundamental differences—like the calibrated micrometer adjustment that assures accurate clearances between rotor and stator (which can be reproduced *exactly* at any time) ... the by-pass assembly that recirculates material until ready for discharge ... the *tangential* discharge outlet that allows material to flow out rapidly at a natural angle, for maximum production ... the safety stop studs for protection of the rotor-stator at small gap settings ... the component design of rotor-stator ... and many other quality features.

In addition, any laboratory, pilot plant, or production model with the standard, open, gravity fed hopper can easily be transferred into a unit suitable for continuous flow operations by interchanging the hopper with the pressure head assembly shown below.

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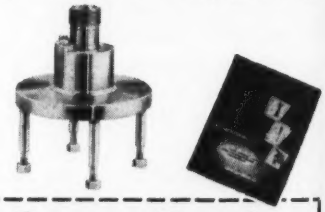

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Yes, please, send me your new Eppenbach Catalog.

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Company_____
Address_____
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Check 3287 opposite last page.

Polymeric plasticizer

Brochure of 12 pages summarizes various investigations carried out on effectiveness of polymeric plasticizer in vinyl plastisol formulations. Several formulation suggestions are given. Report L-101—Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., Kingsport, Tennessee.

Check 3288 opposite last page.

Details liquid controller

Comprehensive 12-page bulletin deals with water usage and its conservation. Valuable data on details of design, capacities, dimensions, and typical installations are presented for device that can be used to regulate flows of liquids in line and, specifically, in filter plants, and to maintain uniform rate of filtration through each filter unit. Bul 900 — Simplex Valve & Meter Company, 7 East Orange St., Lancaster, Pennsylvania.

Check 3289 opposite last page.

Different pump design

Advantages of radically different pump design reported to bring exceptional efficiency to positive-displacement pumping are detailed in manufacturer's literature. Bul TLP-57 and GTA — Manton-Gaulin Mfg. Co., 55 Garden St., Everett 49, Mass.

Check 3165 opposite last page.

Radiation effects

Collection of technical papers on radiation effects on materials is compiled in 196-page volume. Numerous tables of data, and many photographs, diagrams, and graphs are included. To obtain ASTM special technical publication 208, "Symposium on Radiation Effects on Materials," remit $4.75 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pennsylvania.

Check 3290 opposite last page.

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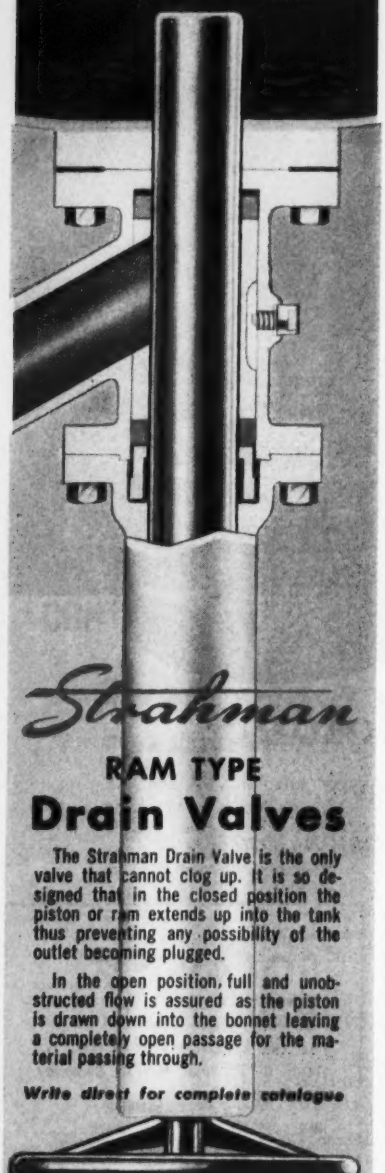

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Check 3292 opposite last page.

NEW LITERATURE

Polyethylene lab-ware

Manufacturer's catalog of 16 pages illustrates and describes line of odorless, tasteless, nontoxic, chemically inert, and translucent polyethylene laboratory ware. Cat 57P — Schaar & Co., 7300 W. Montrose Ave., Chicago 34, Ill.

Check 3293 opposite last page.

Chemically inert packings

Teflon for corrosive or costly fluids or gases are described and illustrated in company's bulletin that lists many types, shapes, and sizes. Bul P-325 — Crane Packing Company, 6421 Oakton St., Morton Grove, Illinois.

Check 3198 opposite last page.

Acrolein, derivatives

First half of 40-page booklet on acrolein and derivatives, outlines chemistry of acrolein and methacrolein. Second half gives properties and uses of 14 acrolein derivatives. Bibliography has 31 entries. Bul F-40, 118 — Union Carbide Chemicals Co., Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y.

Check 3294 opposite last page.

Describes air compressor

Manufacturer's new rotary air compressor is subject of eight-page bulletin. Features are well illustrated and general specifications listed. Bul P-106B — Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

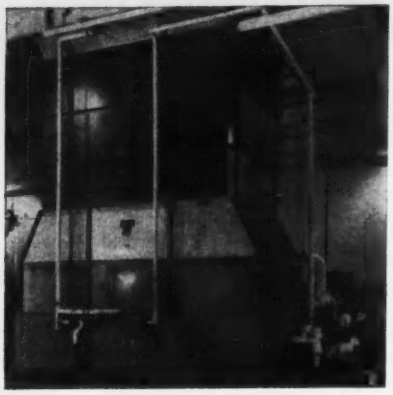
Check 3295 opposite last page.

All-steel ladder-stand

Complete specifications on manufacturer's line of mobile, all-steel safety ladder-stands are contained in eight-page illustrated catalog. All-steel safety ladder-stand cat — Dept. 20, Aluminum Ladder Company, Worthington, Pa.

Check 3296 opposite last page.

WHEREVER YOU NEED TO COOL A FLUID... and have a problem of water supply or disposal... use NIAGARA "AERO" HEAT EXCHANGER



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Stainless steel throughout. Fully sanitary—meets the strictest Health Dept. requirements. Equipped with GROEN-exclusive demountable shaft couplings which cannot disengage in operation, yet permit removal of agitator assembly in a few seconds for easy cleaning. • Large revolving scraper blades maintain movement of contents away from heated walls into baffle. Small blades below prevent settling. Efficiency is positive . . . results dependable. Bulletin RAK-2 gives full, illustrated details. Write for your copy today.

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Gives all the facts and figures. Tells how to get faster, better medium to heavy mixing. Write for this Bulletin now.

Half a Century of Fine Kettles **GROEN**

Check 3298 opposite last page.

NEW LITERATURE

Anionic stabilizer data

Bulletin of six pages covers uses, properties, and stability of anionic stabilizer for natural and synthetic latices. SRS-55 tech bul — Seaboard Chemicals, Inc., 30 Foster St., Salem, Massachusetts.

Check 3299 opposite last page.

Safety tool line

Which safety tools to choose for your particular requirements are indicated in manufacturer's catalog which describes and illustrates equipment. Cat ST-10 — Ampco Metal, Inc., Dept. CP-1, Milwaukee 46, Wis.

Check 3138 opposite last page.

Process pump data

Series of three bulletins covers construction, dimensions, specifications, and operational information on manufacturer's single and multi-stage centrifugal pumps. Buls 121A, 128, and 137—Pacific Pumps, Inc., 5715 Bickett St., Huntington Park, Calif.

Check 3300 opposite last page.

Industrial waste treatment

Catalog of 12 pages deals with system for treating sewage and industrial wastes by activated sludge process. How system works, data on operation, efficiency, and maintenance are provided. Cat 6660 — Yeomans Brothers Co., 2003-5 North Ruby St., Melrose Park, Illinois.

Check 3301 opposite last page.

Describes sifter qualities

Sifting unit that requires less than one-fourth floor space of conventional units, but sifts 2 to 10 times as fast, is discussed in manufacturer's bulletin. Bul 65 — Abbé Engineering Co., 50 Church St., New York 7, New York.

Check 2976 opposite last page.

Emery WEIGHING SYSTEM NEWS

BIN, TANK AND HOPPER EDITION No. 7

Covering design, development and application data on Emery Weighing Systems for industrial applications

ENGINEERS AT PARKE, DAVIS & CO. ADOPT NEW CONCEPT OF TANK WEIGHING IN BROMINE PROCESSING PLANT

SPECIAL CONDITIONS IN BROMINE STORAGE AND WEIGHING AREA PROMPTED SELECTION OF EMERY LOAD CELLS.

In selecting weighing apparatus for a bromine storage and process system at its Holland, Michigan, plant, Parke, Davis & Company engineers were faced with an interesting set of factors which led to the eventual choice of a relatively new concept in process control . . . tank weighing instead of measuring tank contents. Emery Hydraulic Load Cells were selected to handle the weighing job.

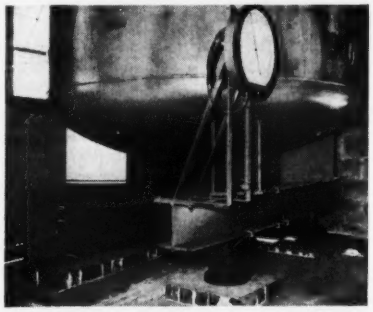


Fig. 1. Close-up view of the bromine storage tank showing how Emery Load Cells support the front end while the back end is carried on a 21" I-Beam.

The process required weighing of bromine in both storage and in process. Liquid bromine is pumped from the storage tank to an elevated intermediate tank where the required amount for use in the process is weighed. Excess bromine in the weigh tank is drained back to the storage tank. The system is vented through a fume scrubber.

The corrosiveness of bromine liquid and vapor dictated that an external gauging system be used. The lead lining of the storage tank precluded the use of gauging systems using radioactive sources. Compressed air of the necessary pressure was not available for weighing equipment using air as a motive force. The possible damage to beam scales by the corrosive action of chemicals and fumes was a deterrant to the use of this equipment. Equipment utilizing an electrical signal would have to be explosion-proof or remotely located from the hazardous area. Thus, Emery Hydraulic Load Cells were selected.

Two EC-30 Emery Cells support the storage tank in front; the back end being carried on a 21" I-Beam. The Emery 16" Indicator is set directly in front of the tank.

The weigh tank is suspended on a sling and linked to an overhead support through another EC-30 Emery Load Cell. A 21" dial indicator is located at floor level at which point the pump control is operated to fill the weigh tank with the required amount of liquid bromine which is then forwarded to the point of processing.

Fig. 2. Emery Dial Indicator for weigh tank is conveniently located above pump control. Operator can fill weigh tank to exact weight, then shut pump off.

In specifying Emery Load Cells in this bromine weighing application, Parke, Davis & Company found that the peculiar conditions surrounding this particular installation were easily met by an Emery tank weighing system.

If you face conditions of a similar nature . . . or if you have a tank weighing problem of any kind, our engineers will gladly study it and make recommendations. Be sure to send for our Bulletins 561 and 571.

Fig. 3. This lead lined bromine storage tank at Parke, Davis & Company, Holland, Michigan, is 10 feet in diameter and 15 feet high and has a capacity of 12,000 gallons of bromine. The tare weight is approximately 17,000 pounds.

Fig. 4. The weigh tank is 4 feet in diameter and 6 feet high. It is glassed steel and has a capacity of 100 gallons of bromine. Tare weight is 800 pounds.

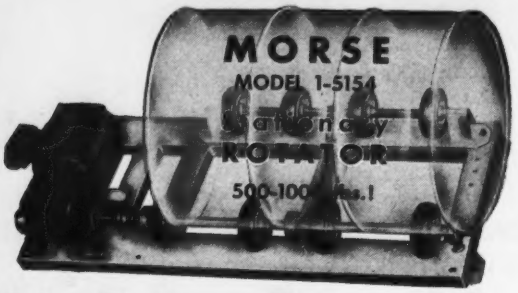
Tank Weighing Data

Our Bulletins 561 and 571 are filled with technical data on tank, bin and hopper weighing; the arrangement of cells and instrumentation; and the new approach to tank weighing through the results you need. If you have not received your copies send for them today.

THE A. H. EMERY COMPANY
Pine Street • New Canaan, Conn.

Check 3302 opposite last page.

HEAVY DRUM ROTATING



Cuts Costs . . . Fast . . . Safe

You can now mix, blend or tumble loads up to 1000 lbs. with the new MORSE Model 1-5154 Stationary ROTATOR. It is primarily engineered for heavy loads in 30 to 55 gallon drums yet lesser loads can be rotated with equal efficiency. Any diameter drum can be mounted by adjusting only three bolts.

The rugged ½ H.P. motor can be geared to give any fixed speed from 5 to 30 RPM. Six inch drive wheels (4) and idler wheels (4) have Neoprene treads for smooth, non-slip revolving. Drive shaft, idler shaft and all welded steel frame are extra rugged construction for long-lasting, trouble free operation.

A double drum model No. 2-5154 with a 2000 lb. capacity is also available. Write today for brochure on complete Morse line.

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737 West Manlius St. East Syracuse, N. Y.

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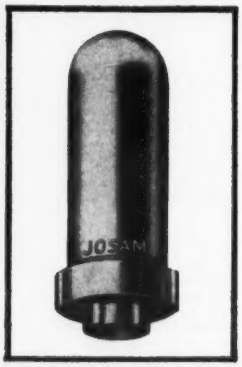
shakes and breaks
FITTINGS and EQUIPMENT
unless you
STOP IT!

install *Josam* SHOCK ABSORBERS



At an unexpected moment a connection will burst or a mechanism break from repeated shocks caused by the rapid closing of a valve or faucet, the stopping of a pump action or any other operation that arrests the normal flow.

Avoid expensive shut-downs and repairs by installing Josam Shock Absorbers. Send now for free Manual SA for details.

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Josam products are sold through plumbing supply wholesalers.

Check 3304 opposite last page.

NEW LITERATURE

Details manual starter

Manual starter in NEMA sizes 0 and 1, and of the two-, three- and four-pole construction, is covered in company's bulletin that details features and specifications. Bul 2510 B-C — Square D Company, 4041 N. Richards St., Milwaukee 12, Wis.

Check 3147 opposite last page.

Lists safety publications

Wide variety of publications to help chemical industry build or improve safety programs are conveniently listed in handy catalog. Chemical safety publications cat — National Safety Council, 425 North Michigan Ave., Chicago 11, Illinois.

Check 3305 opposite last page.

Polyvinyl alcohol bulletin

Specs, solutions, compounding, properties, and industrial uses of polyvinyl alcohols are covered in three-part, 24-page bul M13-T — Chemical Div., The Borden Co., 350 Madison Ave., New York 17, N.Y.

Check 3306 opposite last page.

Teflon lab-ware

Bulletin of four pages presents information on manufacturer's line of Teflon and polyethylene equipment for the laboratory. Bul 581 — Bel-Air Products, 4917 Murphy Place, West New York, New Jersey.

Check 3306A opp. last page.

Industrial truck handbook

Handbook of 94 pages covers all types of powered industrial trucks. Divided into five sections, book covers selection, procedures, and operation. Twenty-page section is devoted to engineering data. To obtain "Handbook of Powered Industrial Trucks", remit $5.00 direct to Industrial Truck Association, Ninth and F Streets, Washington 4, D. C.

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Check 3308 opposite last page.

Pending Legislation

From page 43

The upcoming session promises some action in the form of hearings, recently announced, which will be conducted for the purpose of "re-examining the basic policies underlying our tax laws." In announcing the hearings, scheduled to be held from January 7 to February 7, Jere Cooper (D., Tenn.), the late former Committtee Chairman said "they will be utilized as a source . . . which will guide the Committee on Ways and Means in formulating proposals . . . to obtain a revenue system which is fair, equitable, neutral in impact . . . and which will at the same time produce the needed revenues for the Government."

These will be the first general hearings to review federal income tax policies since those held in 1954. Secretary of the Treasury Robert Anderson will be the first witness, and interested groups have been invited to testify. Business groups, probably including witnesses from the chemical industry, are expected to press for equitable across-the-board reductions in higher-bracket individual income tax rates and corporate income tax rates, rather than just a politically inspired reduction in the lower brackets.

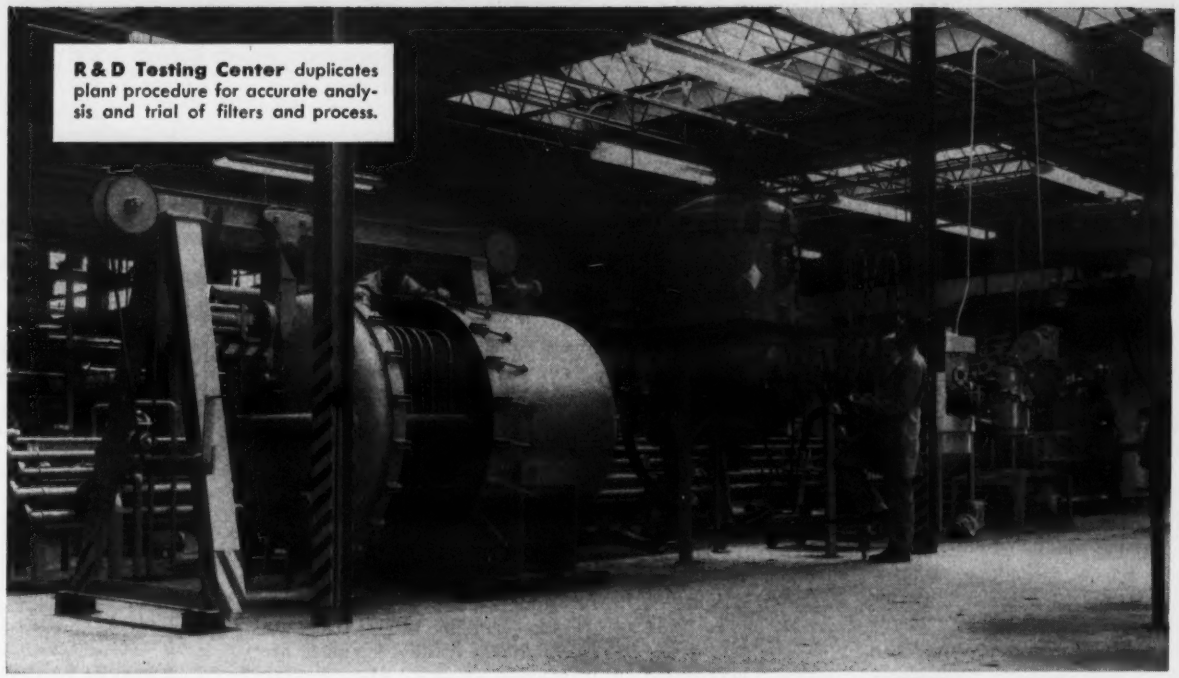
Another bill relating to taxation is H. R. 8381, consisting of 80 amendments to correct unintended benefits and hardships in the Internal Revenue Code of 1954. This has been reported by the House Ways and Means Committee and cleared by the Rules Committee, but consideration by the House has been delayed by procedural problems.

Other tax legislation of interest to the industry includes a House-passed bill to modernize those provisions of the Internal Revenue Code relating to industrial alcohol taxes. The bill is before the Senate Finance Committee.

Natural Gas

H. R. 8525, a bill to relax federal controls over independent natural gas producers, is awaiting action on the House floor after having been

To next page



R & D Testing Center duplicates plant procedure for accurate analysis and trial of filters and process.

New Research Center analyzes filtration under full-scale process conditions

Industrial's Research and Development Division helps you select filters and study processes without disturbing production in your own plant.

Maximum efficiency in filtration can only be gained by **examining filters and the process in actual operation.**

To do this, Industrial can place at your disposal $250,000 worth of equipment and a staff of chemists, engineers and physicists experienced in the problems of liquid-solid separation.

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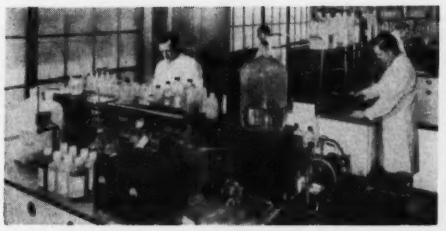
Talking to an Industrial field engineer will put you in touch with the most capable staff and research facilities available today. Bring your filtration problems to Industrial. We will be glad to make analyses and recommendations.



R & D Chemical Laboratory checks and maintains quality control of influent and provides precise analyses of effluent during testing and research operations.

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For estimates submit your drawings to . . .

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. . . for finer regulation of water, oil or gas

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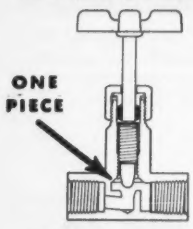

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Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd Street, Edmonton, Alberta, Canada

Check 3311 opposite last page.

Pending Legislation

From preceding page

cleared by the Rules Committee at the first session of the current Congress.[3] This controversial measure was introduced by Representative Oren Harris (D., Ark.), chairman of the House Interstate and Foreign Commerce Committee. The Harris-O'Hara bill (Representative Joseph O'Hara, R. Minn., sponsored a similar measure) is a follow-up to H. R. 6645 which was vetoed by the President during the 84th Congress.

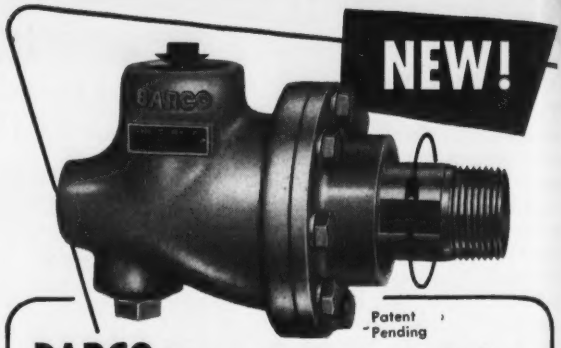
The bill would hold producers' gas prices to interstate pipelines to the "reasonable market price" but would forbid the Federal Power Commission to continue the utility-type control required by a 1954 decision of the US Supreme Court. Despite Chairman Harris' belief that the bill had excellent chances for passage in 1957, a straw-vote taken by the Majority and Minority whips raised doubts regarding passage so it was abruptly postponed. Speaker of the House Sam Rayburn (D., Tex.) explained the postponement on the basis that civil rights and other legislation would take precedence, and his belief that the bill had a better chance of passage in the upcoming session.

The vote in committee to approve the bill was a close 15 to 13, with three members absent and two voting present (these two wanted the bill to provide complete exemption from federal control — the

To page 216

[3] See National Gas Controversy, CHEMICAL PROCESSING, Oct. 1957, p 25.

"I still can't understand how you beat me every game!"



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FOR STEAM, WATER, OIL, AIR OR GAS

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NO LUBRICATION NEEDED—Bearings and seal self-lubricating. Seal self-adjusting for wear.

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COMPACT, SIMPLE—Malleable iron body; heat treated steel shaft; R.H. or L.H. thread. Eight sizes, ½" to 3". **SEND FOR NEW CATALOG 310 TODAY.**
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It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

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In each issue of CHEMICAL PROCESSING you will find numerous stories that will help you solve many of your problems.

You will find these highly informative stories covering all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion to name a few.

These are specific case histories of how processing problems were solved, how someone else has solved the same difficult tasks that you may have.

Each. . .

"New Solutions" article states the operating problem . . . explains how it was solved . . . and describes results obtained.

For more information on product at right, specify 3313 see information request blank opposite last page.

ON TEXAS TOWERS

Wallace Process Piping Co., Inc.

Used

MIDWEST

WELDING FITTINGS

Among the unique installations for preservation of peace are the early warning radar "Texas Towers" off the Atlantic Coast. These artificial islands stilted to the ocean floor keep watch by radar. As is true of many defense projects, Midwest Welding Fittings played a significant part on Texas Towers.

Midwest Welding Fittings are found on unusual and in critical as well as routine jobs because of exceptional quality maintained by rigid standards of manufacture. Quality control is always above and beyond code requirements.

Whatever the piping job, you will find it to your advantage to use Midwest Welding Fittings. The many benefits you get by specifying "Midwest" are shown in Catalog 54. Ask your distributor or write us for a copy.

MIDWEST PIPING COMPANY, INC.

Main Office: St. Louis 3, Missouri (P.O. Box 433)
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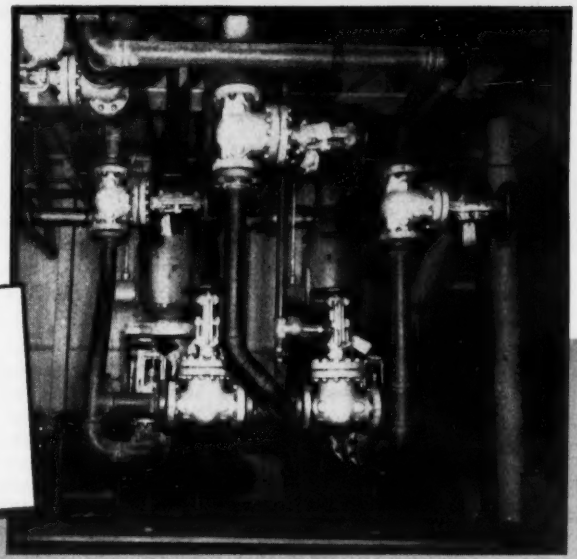
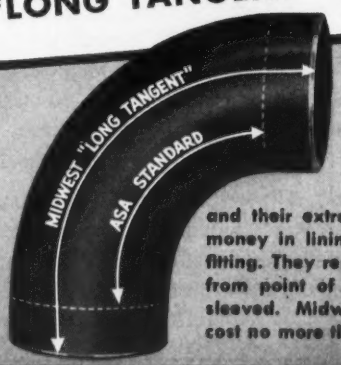


MONEY SAVED With MIDWEST "LONG TANGENT" ELBOWS



Here are the important advantages of Midwest "Long Tangents": They save pipe. They often eliminate short nipples and their extra welds. They save time and money in lining up and clamping pipe and fitting. They remove the circumferential weld from point of maximum stress and can be sleeved. Midwest "Long Tangent" Elbows cost no more than other elbows.

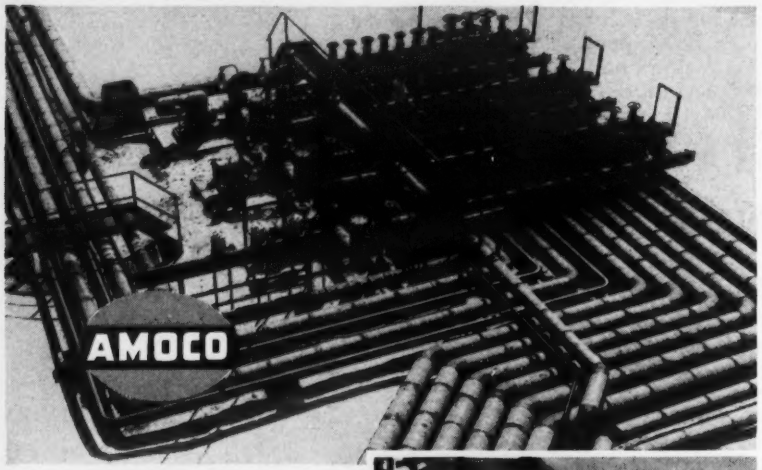
Piping on two Texas Towers was installed by Wallace Process Piping Co., Inc., as subcontractors to Steers Morrison Knudsen and Continental Copper & Steel Industries, Inc. All welding fittings were supplied by Midwest through Central Jersey Supply Co. The many advantages of Midwest "Long Tangent" Elbows were an important factor in the selection of Midwest fittings for this critical work.

7901

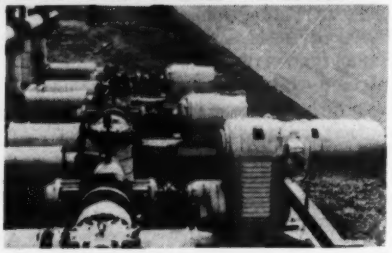
MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS

AMERICAN OIL COMPANY equips two east coast Asphalt terminals with

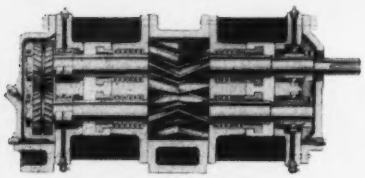
Sier-Bath GEAREX® PUMPS



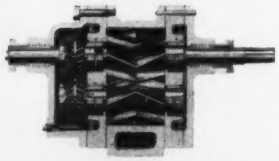
• Above is a typical asphalt terminal manifold using three "Gearex" Pumps. Each pump is designed to deliver 350 gpm. of asphalt with 600-3,000 SSU at 300 to 130° F., discharging at 50 psig. with a 16" Hg. maximum suction lift. The big feature is the external gear and bearing design which protects vital pump parts against damage when handling hot asphalts, crudes, cutbacks and other viscous, non-lubricating materials.



Sier-Bath "Gearex" Pumps



EXTERNAL GEAR & BEARING TYPE
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow . . . quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For sustained high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. Call your local Sier-Bath Pump Representative . . . send for Bulletin G-2. *Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.*

Sier-Bath ROTARY PUMPS

Screw Pumps | Gearex® Pumps | Hydrex® Pumps

50th Anniversary | Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings | Member A.G.M.A.

Check 3314 opposite last page.

Pending Legislation

From page 214

other 13 felt it went too far in relaxing controls).

The majority report on the bill stated that in switching controls from utility-type regulation (cost-plus) to reasonable market price criteria, the bill provides "numerous safeguards to protect consumers not only in their long-term interest in plentiful supplies of gas, but also in their right to fair prices . . . This bill spells out in detail the principles to be applied by the Commission in determining reasonable market prices."

On the Senate side of Capitol Hill the bill has not come up for consideration, but it probably will be considered by the Senate Interstate Commerce Committee during the second session.

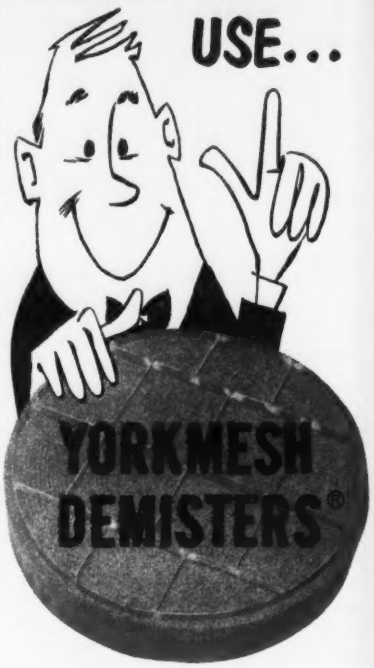
Food Additives

For the past two years Congress has conducted hearings on the subject of food additives. Earlier this year it looked as if one of the bills under consideration might be favorably reported out. Hearings were recessed, however, with the bills moving no further than a House subcommittee, and without testimony of Food and Drug Commissioner George P. Larrick on a FDA-sponsored bill.

For this reason, CHEMICAL PROCESSING asked Commission-

"By the way — did they every catch Jonesie?"

You Should USE...



to get Clean Separation of vapor from liquid in your process equipment!

WHY?

To improve overhead product quality, or to eliminate liquid overhead losses, and permit increased throughput rates.

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improve the performance of:

Vacuum Towers • Distillation Equipment • Gas Absorbers • Scrubbers • Evaporators • Separators, Knock-Out, or Steam Drums

HOW TO ORDER

Send details on type of process vessel or operation, vapor flow rate, pressure, temperature, and density or molecular weight; approximate amount of entrained liquid, viscosity, and specific gravity. Furnish drawing or sketch, if possible.

YORK

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6 CENTRAL AVE. • WEST ORANGE, N. J.

Check 3315 opposite last page.

er Larrick to tell us what his recommendations to Congress will be, and the reasons behind the FDA proposals.

Commissioner Larrick's statement and a report on the thinking of our chemical industry on this legislation starts on page 48.

Enemy Assets

After inconclusive consideration by a Senate committee on the subject of returning, to its former owners, alien property held by the Government since World War II, hearings were begun and then abruptly suspended by a House subcommittee.

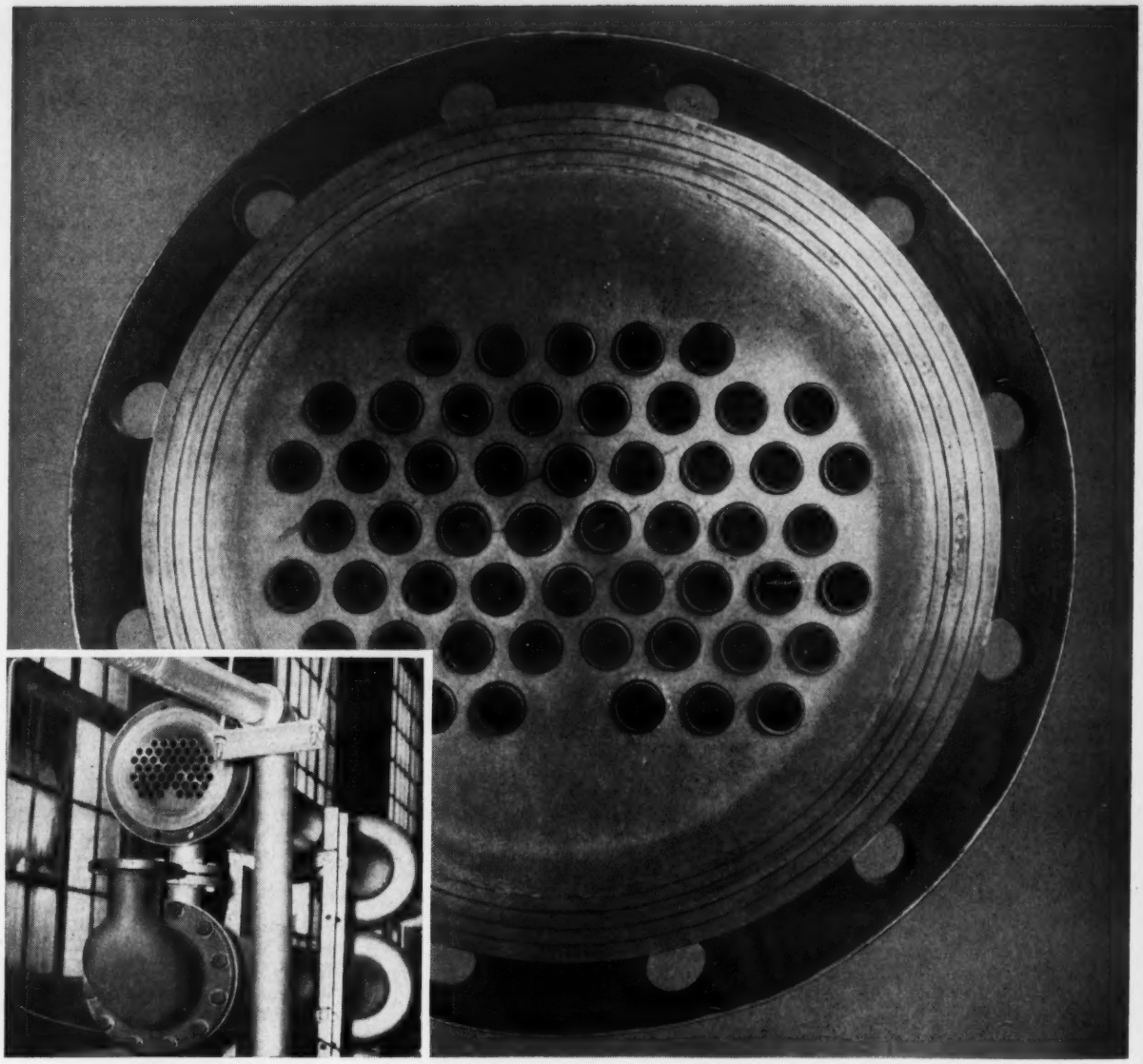
Representative Peter Mack, Jr. (D., Ill.), chairman of the House Interstate and Foreign Commerce subcommittee han-

According to Representative Peter Mack, Jr. (D., Ill.), chairman of subcommittee considering alien property return, hearings were suspended due to sudden policy reversal by the Administration

dling the hearings, stated they were suspended owing to the sudden decision of the Administration to change its policy after hearings had been scheduled. A new proposal is to supersede H. R. 6888, which had been sponsored previously as the "considered position of the Administration." This left Government witnesses entirely unprepared to testify regarding Administration policy. Hearings will probably be resumed as part of a thorough investigation of the issue of war claims and the return of enemy assets.[4] One of the

To next page

[4] See the Smathers proposal for Financing Scientific Education with Seized Enemy Assets, CHEMICAL PROCESSING, Oct. 1957, p. 36.



Carpenter **7Mo Stainless Tubing**

No corrosion . . . no pitting after 4 years of handling hot SO_2 gases and vapors

• The smooth, clean surfaces of the Carpenter 7Mo Stainless tubing in this 3-pass Relief Gas Cooler tell the whole story. Still like new after 4 years of carrying 8% SO_2 gases and vapors from the top of a sulphite digester at temperatures in excess of 200°F. No maintenance. No replacement worries. No costly downtime.

If you have a tough corrosion problem involving stress corrosion cracking and pitting, see what Carpenter 7Mo Stainless Tubing and Pipe can do to solve it for good. Call your Carpenter Distributor for service that satisfies.

MEMBER

The Carpenter Steel Company
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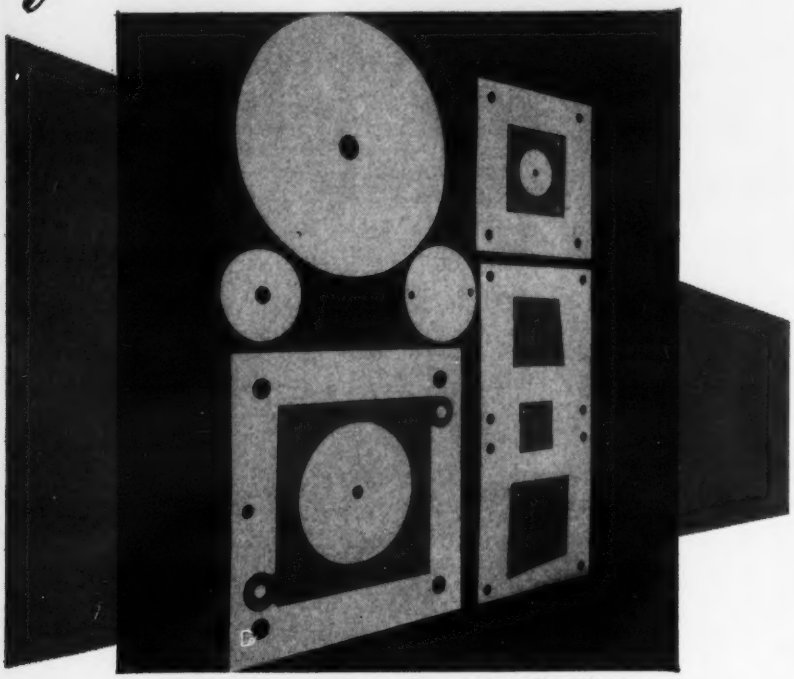
Stainless Tubing & Pipe

Check 3316 opposite last page.

Exceptional clarity of filtrate obtainable.



E-D filter papers cut to exact requirements of your filter. Above are a few of the most widely used sizes and shapes.

In most cases, E-D filter papers can obtain greater clarity of filtrate than is possible with any other filter media.

First, because of their fine porosity. Second, because superior raw materials and rigid production controls result in papers of unmatched purity and quality.

In addition, leading filter manufacturers recommend the use of E-D filter papers as

Time saving: Little or no recirculation is required when used with filter aids.

Labor saving: Easy to handle, easy to dress, easy to remove.

Versatile: Can be used with equal efficiency over filter cloth, metal screens, or perforated plates.

E D *The Eaton-Dikeman Company*

FILTERTOWN
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FREE! *Write for new Catalog 357 showing extensive use of industrial filter papers in plant applications.*

Check 3317 opposite last page.

Pending Legislation

From preceding page

matters to be taken up will be the status of General Aniline and Film Corporation, currently held by the Government.

Labeling

Several bills are pending to regulate interstate distribution and sale of hazardous substances for household use. One of the bills, H. R. 9063, was introduced by Representative John Bell Williams (D., Miss.) chairman of the House Interstate and Foreign Commerce subcommittee which is also holding the hearings on food additive legislation.

With regard to H. R. 9063, Mr. Williams announced in the House of Representatives that hearings would be held during the second session on this and other bills concerned with labeling of hazardous substances.

H. R. 9063, H. R. 7388, introduced by Representative Thomas Curtis (R., Mo.), and S. 1900, introduced by Senator Prescott Bush (R., Conn.) on the same subject, have approval of industry groups.

Patents

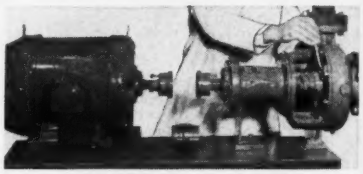
Another bill referred to the busy Senate Judiciary Committee was S. 2277, introduced by Senator Joseph O'Mahoney (D., Wyo.). This bill would aid the jammed Patent Office by simplifying various procedures, establishing a new patent publication system, and limiting the practice of "defensive patents" by which an inventor gets a patent to as-

Sponsor of bill to bring relief to harassed Patent Office is Senator Joseph O'Mahoney (D., Wyo.)

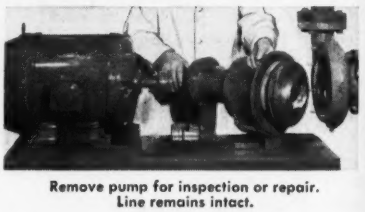
Lovejoy
SPACER TYPE RRL
FLEXIBLE COUPLING
Cuts Pump Maintenance Time

Lovejoy's Spacer Type RRL Flexible Coupling permits the pump to be quickly and easily disconnected from the driving unit without disconnecting the piping. Only two sets of bolts need be removed. Axial movement of shafts is not required. Just three simple steps remove the pump from the line:

Unbolt and remove coupling.



Unbolt back head and cradle combination assembly from casing.



Remove pump for inspection or repair. Line remains intact.

A REAL DOWN-TIME SAVER FOR IN-LINE INSTALLATIONS: Where two pumps operate from one extended shaft motor, Lovejoy Type RRL Spacer Couplings permit independent operation of the pumps. Each pump may be inspected or repaired separately without stopping the motor.

OTHER MAINTENANCE ADVANTAGES: *No lubrication required.* One-piece spider-type cushion visible for inspection at all times. No wear on metal jaws — cushion absorbs load. Available in sizes from 1/20 to 40 hp.

Lovejoy *Request complete information now.*

LOVEJOY FLEXIBLE COUPLING CO.
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Check 3318 opposite last page.

sure himself of exclusiveness, even though he has no intention of exploiting it.[5]

Other bills were introduced to fix fees payable to the Patent Office and to extend terms of patents impaired in some way by war or other causes (*e.g.*, expiration).

Sliding Scale Import Tax on Lead and Zinc

To implement the President's long-range program to encourage domestic development of minerals, the Senate Finance Committee approved a bill to provide a sliding-scale import tax on lead and zinc when prices fall below minimum levels. Hearings were held by the House Ways and Means Committee, which later wrote to President Eisenhower saying that adequate relief could be given to lead and zinc producers by exercise of the President's existing powers to control imports or raise tariff duties.

Accordingly, the House Ways and Means Committee took no action on the bill it was considering.

May Get Action

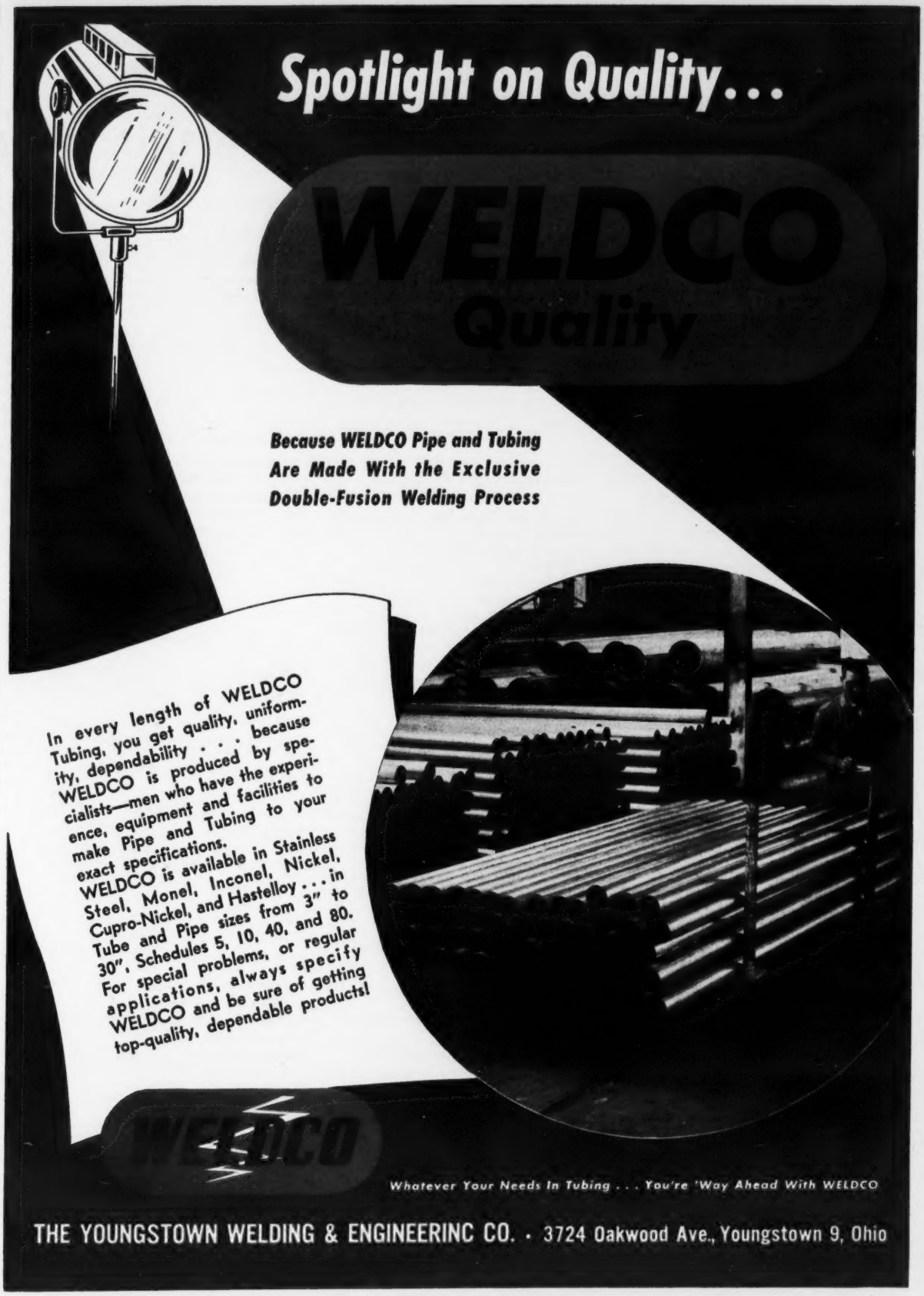
- Other items pending during the second session include the following:

Federal program of research to increase industrial use of agricultural surpluses; long-range research and development program for the coal industry.

- Possible tax relief for small businesses, after completion of hearings being held in cities around the country (although this may be doubtful in view of recent missile developments).
- And legislation to provide for registration, reporting, and disclosure of employee welfare and pension benefit plans.

Matters which may receive election-year consideration include possible legislation to liberalize social security benefits; and probable proposals for legislation to bring unions under the antitrust laws and restrict their activities in other ways, as an outgrowth of the McClellan Committee investigations. ■

[5] See An Amplification of Problems Surrounding Patents, CHEMICAL PROCESSING, Aug. 1957, p 40.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WELDCO Quality
Because WELDCO Pipe and Tubing Are Made With the Exclusive Double-Fusion Welding Process
In every length of WELDCO Tubing, you get quality, uniformity, dependability . . . because WELDCO is produced by specialists—men who have the experience, equipment and facilities to make Pipe and Tubing to your exact specifications.
WELDCO is available in Stainless Steel, Monel, Inconel, Nickel, Cupro-Nickel, and Hastelloy . . . in Tube and Pipe sizes from 3" to 30", Schedules 5, 10, 40, and 80. For special problems, or regular applications, always specify WELDCO and be sure of getting top-quality, dependable products!
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Whatever Your Needs In Tubing . . . You're 'Way Ahead With WELDCO
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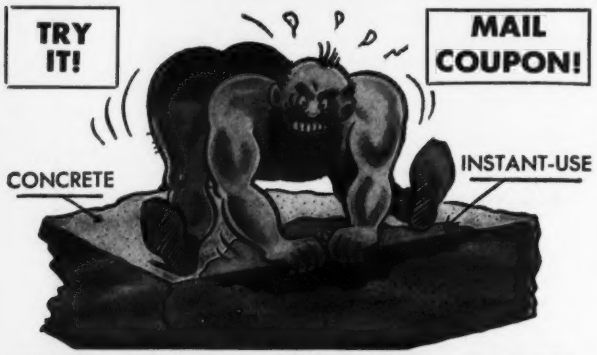

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Name .....
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Check 3321 opposite last page.

THAT'S INTERESTING

From page 5

Elastic highways

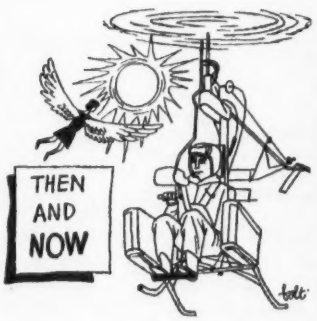
"Surface treated" roads are getting a new treatment. Tests in five states are being made with asphalt containing neoprene synthetic rubber. It is expected that neoprene will add elasticity to asphalt, holding stone chips in place longer. In addition to longer life, this will provide better traction, contributing an important safety factor.

More work on wool

"Engineering" can cut wool shrinkage. Studies at Harris Research Laboratories, Washington, D.C., have shown that length and crimp of fibers, thickness and twist of yarn, and way fabric is woven have marked influence on felting shrinkage. Better "engineered" fabrics will have maximum resistance to shrinkage when washed.

Icarus up-to-date

Icarus may not have been more successful in his attempt to best the birds, but he certainly would have been safer with a modern "Pinwheel" than with his wax-held wings. This one-man helicopter relies on liquid 90% hydrogen peroxide for its power. Each of two rotor blades has a H_2O_2-filled rock-



et mounted in the end. Hydrogen peroxide is converted to a very hot jet of steam and oxygen, released through a nozzle pointing aft. "Pinwheel" flies with a useful load equal to more than twice its weight empty.

It's NEW!
It's EXCLUSIVE!

A 100% PVC CHECK VALVE

RUGGED
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TIGHT SEALING
LOW PRESSURE DROP

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WILL LAST THE LIFE OF ANY PVC LINE!

Technocheck is an exclusive valve principle developed and controlled by Techno Corp. It is employed in polyvinyl chloride and in a variety of metals as well.

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Techno Corporation
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Don't spoil it. KROIL it!

Don't ruin a valuable piece of equipment merely because some part is rusted tight. Apply *KROIL*, the amazing new chemical lubricant that creeps into millionth inch spaces (proved by laboratory tests), dissolves rust, supplies necessary lubrication and . . .

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18,000 of America's leading plants can't be wrong. They have used KROIL for ten years and depend on it to save expensive labor and valuable parts. They say: "Kroil loosened bushings after a 12-ton press had failed" . . . "on repairing heat treat trolleys formerly destroyed every nut. Now Kroil saves them all, and time, too."

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HAT'S NTERESTING

leece marker

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Easy aerosol fleece-marking formulation developed by Du Pont uses lanolin, a wood resin, naphtha, odorless mineral spirits, violet dye and a Freon propellent. This formulation provides a pencil-like jet of dye to eliminate the messy chore of mixing solutions in the field for application with brush or spray.

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This means that in many cases in which metalized quartz could be substituted for glass we may be able to realize better, more reliable materials.

For more information on product at right, specify 3324 see information request blank opposite last page.

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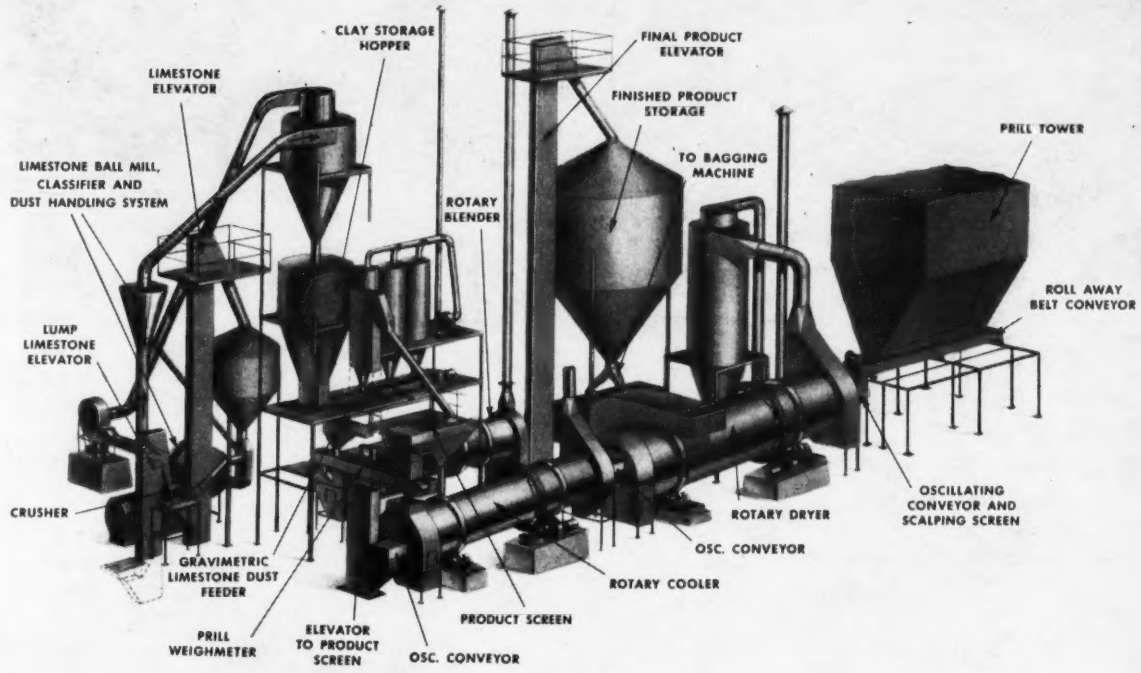

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3) Widely known as designers and builders of bucket elevators, screens, bins and gates, conveyors, feeders and all other materials handling equipment. Thus we can supply — at no higher first cost — all the facilities for an entire system, assuring earlier completion of the project and fully synchronized operation according to plan. *Get full details!*

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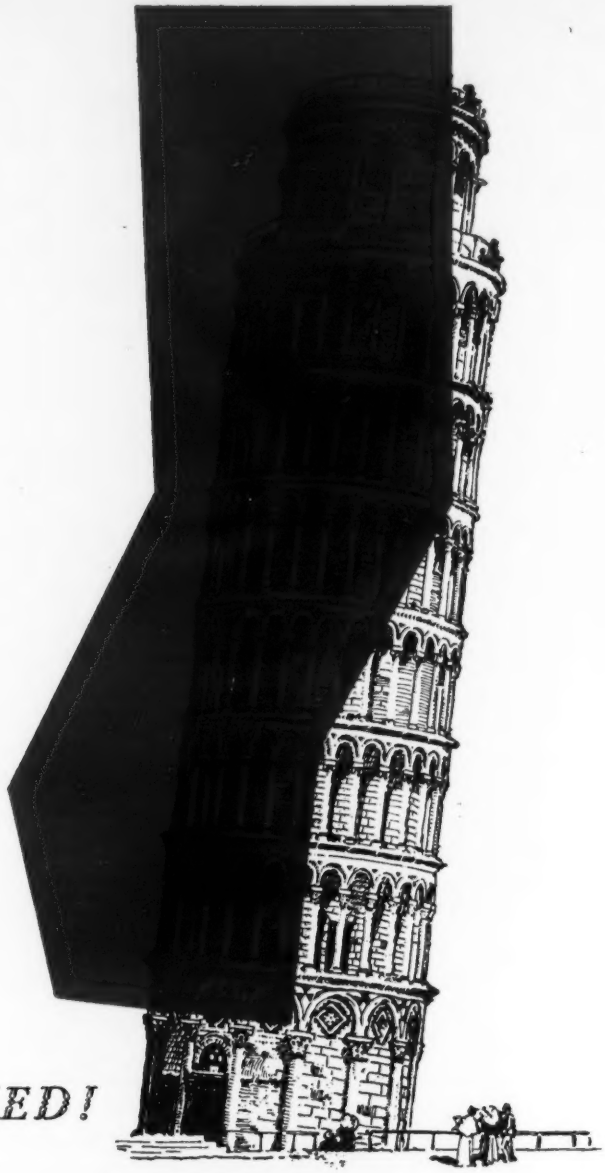

SOMEBODY GOOFED!

Only by a freak of fortune does the leaning tower of Pisa still stand. A faulty foundation was not apparent until the structure was three stories high. It is believed the architects were then forced to compensate by adding weight to the opposite side to save the building.

Are you building corrosion problems into your plant structures and equipment that will inevitably have to be compensated for by tremendous replacement costs? Many of these costs can be eliminated *at the planning stage* by taking advantage of the services of an expert in the field of corrosion resistant coatings... the Amercoat Sales Engineer.

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Amercoat

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BELGIUM ..... Brussels
BELGIAN CONGO .....
CUBA ..... Havana
DENMARK ..... Copenhagen
FINLAND ..... Helsinki
FRANCE ..... Paris
HOLLAND ..... Eindhoven
ITALY ..... Palermo
LUXEMBOURG
SWEDEN ..... Stockholm
SWITZERLAND ..... Geneva
UNION OF SOUTH AFRICA ..... Johannesburg
VENEZUELA ..... Caracas
Maracaibo